AUTOMOTIVE INDUSTRIES

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Industry in the Black at Three-Quarter Post

Spotty earnings showing among car makers contrasts sharply with almost uniformly profitable operations of parts makers

THE three-quarter post in 1933 found the industry in a vastly improved position so far as earnings are concerned over a year ago.

As the accompanying tables show, 11 vehicle companies have reported net earnings of $86,411,000 for the first nine months of 1933 against a consolidated deficit of $13,625,000 in the same period in 1932. Among the parts makers, a group of 25 companies report net earnings of $9,007,000 for the nine-month period which contrasts sharply with a group deficit of $8,827,000 in the similar period last year.

While it is true that only three of the car manufacturers included in the table are in the black at the end of the third quarter, all but two of the group have improved their earnings position. This spotty showing is due of course to the fact that the expansion in volume this year has been entirely in the low-priced field and the principal beneficiaries thereof have been Chrysler, Ford and General Motors.

Cars listing above $750 in general have fallen far behind 1932 volume and this explains the unfavorable showing of most of the companies still in the red as for the most part their volume comes from the medium and high-priced fields. Their ability to cut their losses in the face of the volume shrinkage they have suffered, can only be regarded as tribute to the sagacity of their management.

The situation among the parts makers is quite different. Here the benefits of expanding industrial volume have been broadly distributed. Of the 25 companies listed in the table only seven are in the red at the end of nine

Net Income of 11 Vehicle Companies

(000 Omitted)

	Nine Months		3rd Quarter
	1933	1932	1933
Auburn	$1,464*	$ 603*	$354*
Graham	146	966*	122
Hudson	1,307*	4,630*	19
Hupp	1,196*	3,405*	415*
Mack	567*	962*	85*
Nash	710*	718	431*
Packard	487*	4,417*	623
Pierce-Arrow	273*	1,708*	273*
Reo	1,079*	1,980*	316*
Sub-Total	$6,937*	$17,953*	$1,251*
Chrysler	$11,938	$ 6,227*	$ 7,190
General Motors	81,410	10,555	33,342
Grand Total	$86,411	$13,625*	$39,281

*Deficit

Net Income of 25 Parts Companies

(000 Omitted)

	Nine Months		3rd Quarter
	1933	1932	1933
Auto-Lite	$ 850	$1,459	$534
Bendix	1,096	367*	547
Bohn	1,159	74*	549
Borg-Warner	980	40*	649
Briggs	891	1,003*	989
Budd Mfg.	253*	1,254*	50
Budd Wheel	263*	1,010*	24
Campbell, W. & C.	80	271*	61
Eaton	293	268*	262
Hayes Body	273*	270*	75
Houdaille	76	296*	109
Kelsey-Hayes	235*	1,782*	67
McCord	11	369*	5
Midland	665	434*	342
Motor Products	169	212*	120
Motor Wheel	313	339*	198
Mullins	157*	6*	18
Murray Corp	344*	1,420*	133
Raybestos	695	186*	465
Reynolds Springs	102	137*	31
Spicer	115*	613*	23*
Thompson	280	75*	136
Timken Roller	1,624	27*	970
Trico	930	745	391
L. A. Young	433	78*	196
Grand Total	$9,007	$8,827*	$6,898

*Deficit

months, whereas a year ago at the end of the third quarter only two of these companies were in the black.

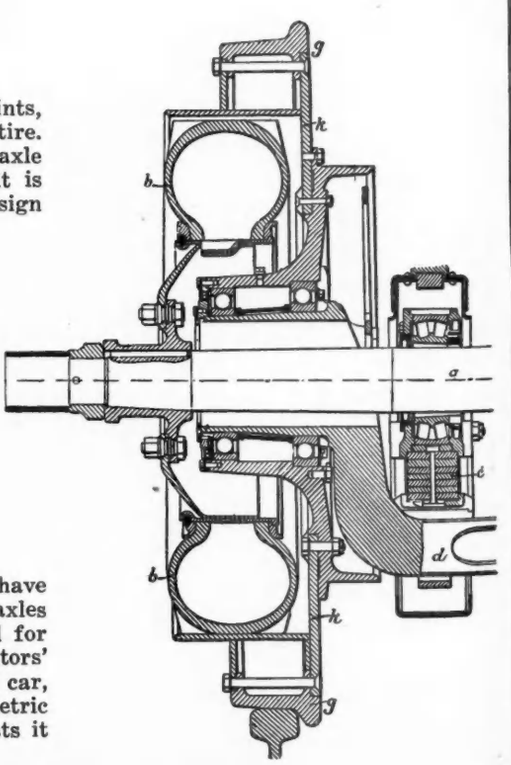
The reasons for the broader distribution of earnings in the parts field are more or less obvious. To varying degrees, the different companies in the group have benefited by the big expansion in the low-priced market because in general their volume comes from vehicle makers in all fields. Consequently, what they have lost in some quarters, they have more than made up in others. In addition, in many cases, larger sales in the replacement field have helped to swell the total of gross and net income.

The fact that so many parts makers were able to report such relatively favorable earnings in the third quarter, suggests that the higher labor costs which the code makes mandatory may not prove an intolerable burden, inasmuch as during August and September many parts makers were meeting NRA wage and hour requirements. The determining factor of course will be volume available next year which will be influenced by the activity of the car and replacement markets, and the effect of higher prices under the code on the relative amount of business car makers place with parts suppliers.—D. B.

Pneumatic Tires Within the Wheels

In a recent issue we gave a brief description of the Austro-Daimler railcar which has wheels with pneumatic tires that roll on the inside of drums of slightly larger diameter, attached to flanged railroad wheels. The illustration herewith, reproduced from *Automobiltechnische Zeitschrift*, represents an axle and wheel construction for railcars known as the "pneuacier," which is credited to the de Dietrich firm of Niederbronn, Alsace. This construction appears to be identical with that of the Austro-Daimler and is probably builtunder license. There are two axles, one of which carries the flanged steel wheel and the other the pneumatically-tired wheel. The axle carrying the rubber-tired wheel is solid and extends through a large-diameter hollow spindle of the cranked axle carrying the flanged wheel on ball bearings. The leaf springs for the truck are hung from the revolving axle carrying the rubber tires, through roller bearings of the double-thrust and radial type. Any shocks to the flanged wheel, such as those due to rail joints, are cushioned by the pneumatic tire.

It is stated that the load per axle can be as high as 7 tons, but it is planned to bring out a similar design for greater loads. Test runs have been made with a railcar having axles of this design which is designed for 35 passengers and has two operators' stands. With 80 hp. engine this car, ready for service, weighs 8 metric tons (17,600 lb.), and in the tests it attained a speed of 62 m.p.h.



Sectional view of dual (steel and pneumatic) railcar wheel

JUST AMONG OURSELVES

The Code Will Carry On

THE steel industry code expired on Nov. 19th. Aside from the automobile manufacturers' code, the steel code is the only one thus far set up on a temporary basis. Like the automobile code, it carries on after the date of expiration unless either the manufacturers or the President ask changes. No request for change has come from the steel makers and, we understand, none is likely; they are satisfied to carry on.

The steel men have many reasons for satisfaction with code operation, it seems to us, which are lacking in the case of the automobile builders. Chief among these reasons are the price-fixing provisions which are in the steel code and which the steel men believe to be definitely advantageous to them.

The longer we watch the automobile code in operation, the more questionable seem its advantages to the manufacturers. Its wage and hour provisions are not obnoxious to most vehicle makers, but a majority would comply with the standards set whether there was a code or not. Not even the most radical critics of the automobile industry could class it with the textile as a sweatshop and child labor industry. It has been traditionally a payer of relatively high wages.

The automobile manufacturers do not need nor want price fixing privileges; nor do they feel the need of agreements about marketing practices so far as their own operations are concerned. Government-enforced regulations about merchandising may be needed in the automotive retail field—perhaps even among parts manufacturers who are selling to the industry; but the vehicle producers themselves have felt no such need in the past.

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The Cloud on The Horizon

AUTOMOTIVE executives, we find, have little to say about code matters these days. Certainly there can be no question that the labor situation in general and the labor clauses of the NRA code in particular still dominate their thinking, however completely it may be absent from their speaking.

The tool and die makers' strikes, although largely settled now, did a damage which cannot be repaired. Needless unemployment was created, some work which left Detroit probably never will return and some sales lost through the delays in production and in new models never will be made up.

Fears of similar tie-ups can hardly fail to make manufacturers a bit cautious about the size of commitments for materials and supplies. Most of them are prepared to go ahead again on a normal basis, but not even the most optimistic think that the end of labor troubles has been seen.

Granting plenty of imperfections in the handling of its labor problems, it is significant that employer-employee relationships in the automobile industry in the past were good enough so that persistent attempts at union organization failed because of lack of sufficient employee interest. Several automobile companies have experienced the first strike in their history since the beginning of NRA. These are among the facts which have given pause to more than one executive. Try as they may to be impartial in their thinking, it is hard for many automotive men to see the need for the same sort of corrective measures in their industry as may have been needed in some other industries where progress was at a standstill due to flagrantly unsocial practices both in merchandising and industrial relations.

* * *

But the Tax Dwindles

THE automotive industry will benefit directly from the repeal of prohibition as well as indirectly. The National Recovery Act provides for the reduction of the national gasoline tax from 1½c. to 1c. per gallon upon the repeal of the 18th amendment. If we read the law correctly, it is to be expected that this reduction in tax will take place on Jan. 1, 1934.

* * *

LEGAL restrictions on overall length of trucks keep demanding shorter and shorter vehicles. Ingenuity of designers is being taxed more all the time.

One result already apparent is an increase in the number of engine-under-the seat models. Autocar, once the sole proponent of this type of vehicle, will no longer be alone in the field; in fact it will have plenty of company eventually.—N.G.S.

New Bugatti Railcar Capable of

Driven by four 200 hp. eights through friction clutches—Charentaise car a light weight design for branch lines

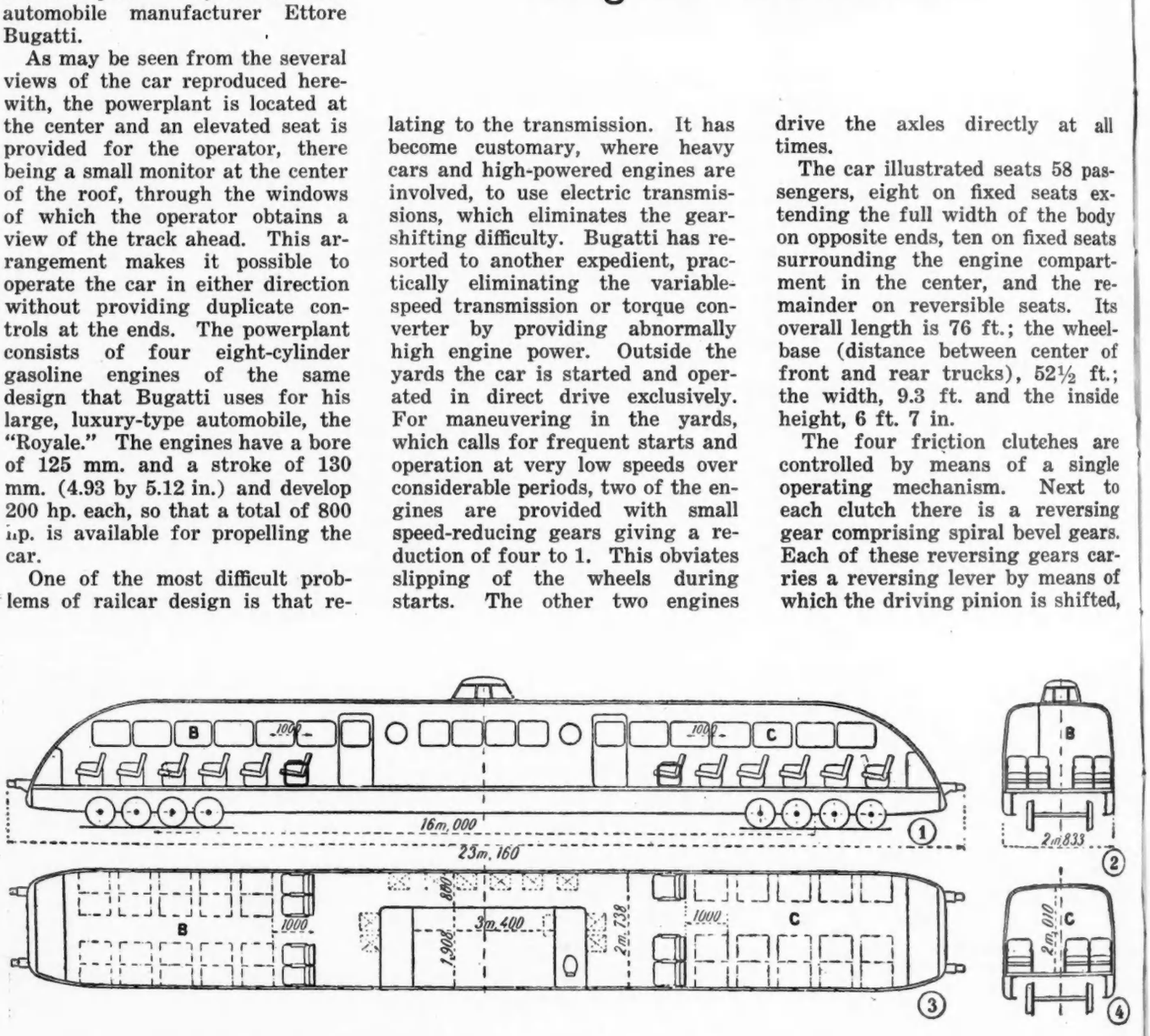
A railcar embodying many novel features and which has already shown itself capable of high speeds has been produced by the Alsatian automobile manufacturer Ettore Bugatti.

As may be seen from the several views of the car reproduced herewith, the powerplant is located at the center and an elevated seat is provided for the operator, there being a small monitor at the center of the roof, through the windows of which the operator obtains a view of the track ahead. This arrangement makes it possible to operate the car in either direction without providing duplicate controls at the ends. The powerplant consists of four eight-cylinder gasoline engines of the same design that Bugatti uses for his large, luxury-type automobile, the "Royale." The engines have a bore of 125 mm. and a stroke of 130 mm. (4.93 by 5.12 in.) and develop 200 hp. each, so that a total of 800 hp. is available for propelling the car.

One of the most difficult problems of railcar design is that relating to the transmission. It has become customary, where heavy cars and high-powered engines are involved, to use electric transmissions, which eliminates the gear-shifting difficulty. Bugatti has resorted to another expedient, practically eliminating the variable-speed transmission or torque converter by providing abnormally high engine power. Outside the yards the car is started and operated in direct drive exclusively. For maneuvering in the yards, which calls for frequent starts and operation at very low speeds over considerable periods, two of the engines are provided with small speed-reducing gears giving a reduction of four to 1. This obviates slipping of the wheels during starts. The other two engines drive the axles directly at all times.

The car illustrated seats 58 passengers, eight on fixed seats extending the full width of the body on opposite ends, ten on fixed seats surrounding the engine compartment in the center, and the remainder on reversible seats. Its overall length is 76 ft.; the wheelbase (distance between center of front and rear trucks), 52½ ft.; the width, 9.3 ft. and the inside height, 6 ft. 7 in.

The four friction clutches are controlled by means of a single operating mechanism. Next to each clutch there is a reversing gear comprising spiral bevel gears. Each of these reversing gears carries a reversing lever by means of which the driving pinion is shifted,



This Bugatti railcar has the same dimensions as the large European sleeping cars. The engine compartment, containing four 200 hp. engines, is at the middle. The cross sections show two possible seating arrangements.

of 107 M.P.H.

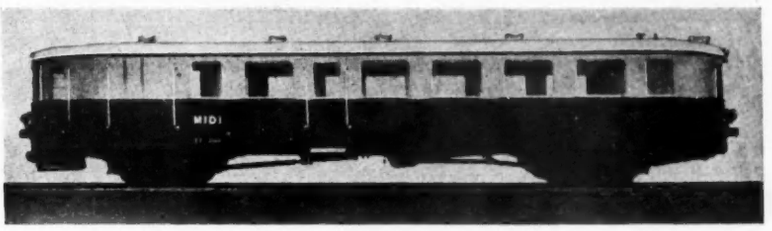
so as to obtain either forward or reverse motion. There is also an intermediate idling position for the lever.

Each set of two engines drives the truck nearest to it; however, each of the two engines of a pair may be operated singly, so that the car may be started up by one, two, three or four engines. For fuel, either a gasoline-alcohol mixture or a gasoline-benzol-alcohol mixture may be used, and it was planned to make tests to show which of the two is the most economical and involves the least fire risks.

The car is supported on two four-axle trucks in such a way that a vertical rise of any of the wheels due to unevenness of the track results in a rise only one quarter as large of the car body. Moreover, the bearings for the various axles are so mounted that on curves the wheels on the same side of the car can move laterally relative to each other, and thus follow the track more closely.

The frame of each of the two trucks is built up of pressed-steel members and is supported on four axles by four sets of springs of the half-elliptic type. Each one of these pairs of springs is supported by one driving and one carrying axle. The carrying axles are "dead" axles and are fitted with "automobile-type" wheels, while the driving axles carry "railway-type" wheels and are driven from the propeller shaft through bevel gears. The car body rests on the trucks through the intermediary of two large longitudinal leaf springs which rest on wear plates secured to the truck chassis. Rubber blocks interposed between the springs and the shoes bearing on the wear plates prevent the transmission of rail shocks to the car body. Drive is transmitted through a central king pin which has no other function.

Over a straight, level stretch of 5 miles the car maintained a speed of 103 m.p.h., while over one-quarter of a mile a speed of 107 m.p.h. was attained. Braking tests showed that the car could be brought to a stop from a speed of 62.2 m.p.h. in 1115 ft.; from 74.7 m.p.h. in 1310 ft., and from 93.3 m.p.h. in 2300 ft. As a result of the trials the car was officially approved for use on the French railroad system and has been in service for some time between Paris and the coast resort Deauville, the distance of 137 miles being covered in two hours.

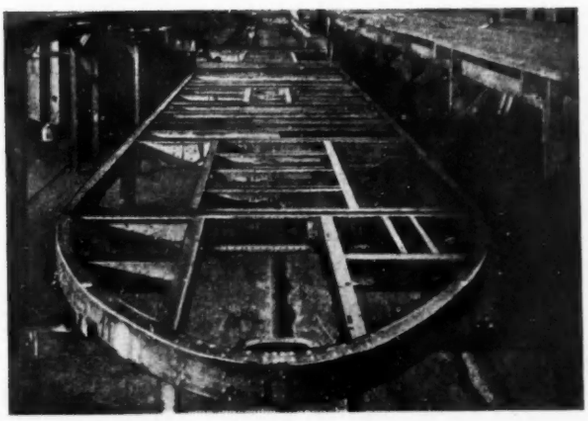


"Pauline" railcar of the Société des Entreprises Industrielles Charentaises, for 55-60 passengers.

The streamlining on the Bugatti car is carried out somewhat differently from that on certain other railcars, in that the air is displaced almost exclusively vertically by the entering end of the car, rather than laterally. This is said to prevent whistling when passing a train at high speed, which might be caused by compression of the air between the train and the railcar if the latter were streamlined laterally.

Another type of railcar for use on branch lines with little traffic has been in production for some time by the Société des Enterprises Charentaises of Aytre, France. While designed to carry even more passengers than the Bugatti, it is much shorter and carries an engine of little more than one-tenth the horsepower of the former. Economy of operation evidently was the chief object in view, rather than impressive performance, in the design of this light railcar, of which some twenty already have been placed in service by various French railway lines. All of them are identical in design except as regards the interior equipment, some being arranged to seat 60 and others to seat 55 passengers.

In the construction of this car the greatest possible use was made of light alloys. There is no separate chassis frame, the body itself being the carrying member. It is of trussed construction. The floor is laid on a framing consisting of duralumin channels extending all around the car, which are connected by numerous cross members of box section. Side pillars, roof



View of duralumin floor framing of the "Pauline"

Roof structure of the "Pauline" in two stages of completion

rail, etc., are all made of duralumin. The roof is covered with sheet aluminum of 0.040 in. thickness which is riveted to T-section carlines of 1.6 by 1.6 by 0.16 in. section.

Complete streamlining was out of the question, as the cars have to be operated in both directions, hence the ends were given a rounded profile. This tends to reduce the air resistance, and as a further means to the same end the height was kept down to a minimum. The cars are designed to be operated singly and are therefore provided with single bumpers at each end, but if it is desired they can be provided with the regulation railroad bumpers.

The over-all length of the car body is 48.5 ft., the width, 9.5 ft., and the height above the rails, 9.1 ft. The distance between the inner axles of the two four-wheeled trucks is 26.3 in. and the wheelbase of each truck, 35.4 in.

At one end of the car a space is partitioned off for the engine compartment and a toilet, while the opposite end is partitioned off to form a baggage compartment, the latter having a floor space of approximately 50 sq. ft. Non-shatterable glass is used all around. All hardware is of polished aluminum, the alloy used being known as 51 SM. Heating of the passenger compartments is by means of radiator tubes mounted along the side walls above the floor level, through which the hot water of the engine cooling system is circulated.

The use of all-aluminum construction is, of course, rather new in railway practice, and for this reason the body of the car was subjected to rather searching tests as to its behavior under load. It was supported at eight points underneath cross members of the floor framing, the outer points being located approximately where the body sides begin to curve inward, and the inner ones about one-third the distance from the outer points to the center of the car. When subjected to a load of 24,600 lb., which is said to be 4,400 lb. more than the body has to sustain when fully loaded, the deflection at the center was only about 0.12 in. and that at the ends, minus 0.040 in.

The car is equipped with a Diesel engine (Junkers license) of the Compagnie Lilloise des Moteurs, with three cylinders of 85 mm. (3.34 in.), developing 85 hp. at 1500 r.p.m. The contrast between this small powerplant and that of the Bugatti is strikingly reflected by the cylinder figures—three 3.34-in. cylinders against thirty-two 4.92-in. A maximum fuel consumption of 0.486 lb. per hp.-hr. is guaranteed. Radiators are placed underneath the floor beams at both ends of the car. The air flow through the radiators can be controlled by means of shutters, in accordance with the readings of heat indicators on the control stands at both ends of the car.

Speed control is accomplished by means of a five-speed gear box, and there is also a separate reversing gear, mounted between the engine and the transmission.

The drive is through the two inner axles. Wheels are keyed to the driving axles, which latter are tubular and of electric-furnace nickel-chromium steel, heat treated. Outside and side diameters of the shafts are 4.33 and 2.75 in. at the center and 2.75 and 1.18 in. at the spindles, respectively. Wheels are of the disk type, comprising two alloy steel disks secured to the hub and tire respectively.

Since in the design of the car every effort was made to combine minimum weight with maximum rigidity, the following weights of parts should be of interest:

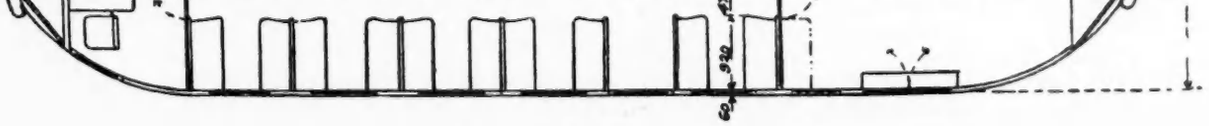
	Lb.
Sheets, shapes and tubes of duralumin and aluminum	6,515
Alfol insulation and attaching wires of almasilium	39.7
Aluminum castings	817
Brass and bronze parts	74.6
Steel sheets, shapes and tubes	506
Red copper tubes	2.7
Steel forgings and steel and malleable castings	1,050
Screws, bolts, washers, pins	304
Lining of the body	1,621
Doors	174
Seats, including upholstery	908
Paint	492
Springs	851
Axles and bearings	4,400
Mechanical equipment	3,240
Electrical equipment	1,120
Hydraulic braking gear	558
Radiators	132
Oil, grease	99
Gas, oil, water, sand	805

The principal parts of the car have the following weights:

Body	11,670
Trucks, springs	6,300
Powerplant	3,240
Electrical equipment	1,120
Brakes	558

The bare body weighs only about 7300 lb.

This information is taken from *L'Aluminum*, to which we are indebted also for the illustrations of the Charentaise car.



Floor plan of the "Pauline"

Extension of the Steel Code Continues Vexing Problems

Price situation resulting from imposition of extras remains unclarified. "Lump Sum" charges burdensome both to small lot buyers and specialty mills

EXTENSION of the Steel Code to May 31, 1934, definitely means that automotive buyers will have to increase the budget for steel purchases for new models, assuming of course that the provisions of the code are followed to the letter. How much larger the bill will be no one is prepared to say, although by this time most buyers have a pretty good idea of what it means to them.

Actually the sharp increases in base price have occurred chiefly in the case of body sheets and cold rolled strip on which the steel mills are said to have been taking heavy losses. Alloy and carbon specification steels have usually exhibited a rather firm price structure and are not expected to change materially in base price.

The disturbing element in the price situation is the imposition of various extras, some old, many new. The difficulty in generalizing as to price increases arises from the fact that only the individual buyer and his source of supply know what the previous price has been and just how much the extras had been shaded or ignored before the code went into effect. These conditions make it rather difficult, if not impossible, to estimate the actual increase in steel cost per vehicle.

Code committees of the American Iron and Steel Institute with the cooperation of experts from various steel mills have been working feverishly toward a practical solution of the many vexing problems introduced with the publication of the basic code. As speedily as possible the needed revisions in the Code are made by issuing Commercial Resolutions with the approval of the directors of the Institute.

Among the most significant revisions was an amendment to Commercial Resolution No. 13 relating to the imposition of freight rates which as originally published constituted a serious hardship to automotive buyers in the Detroit area. The revision permits a deduction up to $3 per ton from the all-rail tariff on various steels delivered in the switching limits of Detroit. The deduction goes up to $4 per ton on blooms, billets and slabs (alloy and carbon steels) delivered at any place in Michigan outside the switching limits of Detroit. While it is claimed that this puts the base prices back where they were before the Code went into effect, no one is willing or able to say so positively.

Apropos of this, we understand that a tariff committee of the Institute has been laboring at the task of compiling the actual point-to-point tariff schedules for various types of materials, calculated from the established basing points. This schedule is expected to be ready for publication very soon.

At the present writing the trucking allowance on shipments made by truck instead of rail remains at 65 per cent of the all-rail freight base despite the protest of the American Trucking Associations, Inc. As noted in *Automotive Industries*, Oct. 21, the ATA charged that this rate was discriminatory inasmuch as it increased the base price of steel by truck delivery by an amount equal to 35 per cent of the all-rail freight rate. Whether anything will be done to correct the situation depends entirely upon the attitude of the directors of the Institute.

Some idea of the extras which now are a part of the Code price structure may be gained from study of the loose-leaf manual, "Uniform Extras and Deductions for Products of the Iron and Steel Industry," recently released by the Institute. Perhaps the most troublesome ruling in the code of uniform extras is the provision relating to "lump sum extras" for less than carload lots.

It is really a serious matter in the case of finished bars, the lump extras per lot shipment running as follows:

less than 6000 lb. down to 4000 lb.—$2
less than 4000 lb. down to 2000 lb.—$4
less than 2000 lb. down to 1000 lb.—$8
less than 1000 lb.—$12.

The full implication of the lump sum extras and the reasons behind the opposition to the schedule on the part of some steel mills may be appreciated from the following general statement of the background for this resolution. In a laudable effort to cooperate with the NRA and to clean house in general, the steel industry has attempted to strengthen the position of the steel jobber by encouraging all but the very largest buyers to order through jobbers rather than direct from the mill. Hence the prohibitory lump extras. Now, although the jobber must pay the same extras if he buys in small lots, it is hoped that if he gets enough of the business he can buy larger quanti-

ties, perhaps carload lots, avoid the penalty of the lump extra and pass the saving on to the buyer.

In theory this is excellent, but in practice it's not so good, according to comment within the industry. In the first place the jobber, no matter how big, can't possibly stock all the sizes and specifications of alloy and carbon steel bars, tool steels, and the like. So he can't serve the trade out of stock and unless the demand for any specific product is heavy he must buy in l.c.l. quantities and pay the lump sum extra which will be passed on to the buyer.

But the most important effect of all this lies in its application to the business of the successful steel producers who have flourished as specialists catering to the demand for special alloy steels, tool steels, etc., in what might be termed job lots.

The business of these specialists is predicated upon the demand for small lots rather than large tonnages. To cite one example consider the case of a certain well-known steel specialty mill which has been producing a grade of tool steel rolled from standard alloy steel billets, making a product that has been sold at a profit for say eight cents a pound in small lots. Under the Code if the product is ordered in lots under 1000 pounds the extra alone comes to $12 for the lot. Thus if the customer orders 100 pounds of this grade of steel the extra alone must be 12 cents a pound or 172 per cent of the selling price. This will tend to wipe out most of the special bread-and-butter business heretofore obtained because of the attractive price.

Everyone concerned realizes the need for speedy action in the matter of Code revision and interpretation in the interest of better understanding between the buyer and producer and certainly in the interest of stabilization of steel mill operation.

It was because no one was quite sure of the trend in prices that we saw the heavy surge of buying on the part of the automotive industry during the few months prior to the deadline of Code operation. This forced the steel mills to accelerated production schedules, multiple shifts and night work. The demand fell off sharply as the buyers accumulated the needed stocks.

Naturally such operation is contrary to economy and general business stability, yet there can be no improvement in the situation until the matter of prices and regulations is made plain and understandable. When the buyer is assured of stable conditions in this respect he will so regulate his purchases.

Over 50 Product Groups at Work on Trade Practice Supplements to A.P.E.M. Code

DETROIT—With the basic Code out of the way manufacturers of parts and equipment in the Automotive Parts and Equipment Industry are devoting their attention to the formation of product groups. Over 50 groups are now in various stages of code writing, several of which, however, have been admitted to preliminary hearings in Washington. The list of groups, together with name and address of the individual in charge, follows:

Armature Group:
M. B. Mervis, General Armature Corp., 1526 S. Wabash Ave., Chicago, Illinois.

Automobile Bumpers:
Howard McCann, Eaton Mfg. Company, Cleveland, Ohio.

Automotive Cushion Spring:
L. A. Young, Chairman, L. A. Young Cushion Spring Co., Detroit, Michigan.

Automotive Exhaust Muffler Group:
James A. Fowns, Chairman, 1229 Goebel St., Pittsburgh, Pa.

Automotive Jack Group:
Malcolm McCormick, Chairman, c/o Walker Mfg. Company, Racine, Wisc.

Automotive Reflecting and Lighting Devices Association:
H. R. Kerans, Sec'y, K-D Lamp Company, Cincinnati, Ohio.

Automobile Hot Water Heater Inst.:
C. C. Bradford, Chairman, Eaton Products Company, Cleveland, Ohio.

Automotive Radiator Institute:
P. L. Darter, Chairman, McCord Radiator Company, Detroit, Michigan.

Axle Association:
E. H. Parkhurst, Columbia Axle Company, Cleveland, Ohio.

Axle Shaft Mfg. Group:
W. C. Bulette, Chairman, Brandt-Warner Mfg. Co., York, Pa.

Brake Drums (Replacement)
Howard Powell, Motor Wheel Corporation, Lansing, Michigan.

Brake Parts (Automotive)
S. Berkowitz, Berkley Mfg. Company, 252 Genesee Street, Utica, N. Y.

Rolled Bronze Bushings Group:
Ben Hopkins, Chairman, Cleveland Graphite Bronze Co., Cleveland, Ohio.

Cast Bronze Bushing Institute:
P. J. Flaherty, Chairman, Johnson Bronze Co., New Castle, Pa.

Carburetor Group:
H. R. Schausten, Tillotson Mfg. Company, Toledo, Ohio.

Chain (Roller & Silent) Ass'n:
F. C. Thompson, Morse Chain Company, Ithaca, N. Y.

Chemical Specialties Group:
G. W. Sherin, Chairman, E. I. duPont deNemours Co., Wilmington, Del.

Cylinder Head Group:
H. E. Lemmerman, Chairman, Simmons Mfg. Co., Cleveland, Ohio.

Automotive Electric Association:
Earl Turner, 1365 Ontario St., Cleveland, Ohio.

Gears (Timing):
David H. Daskal, Chairman, Perfection Gear Company, 213 North Morgan St., Chicago, Illinois.

Gears (Replacement) Group:
Wm. Metz, Springfield Manufacturing Co., Springfield, Ohio.

Horn Group:
H. M. Johnston, Sparks Withington Company, Jackson, Michigan.

Instruments (Automobile)
John Airey, King-Seeley Corp., Ann Arbor, Mich.

Internal Combustion Engine Inst.:
Edward P. Deacon, Chairman, Climax Engineering Co., 111 W. Monroe St., Chicago, Ill.

Lighter Group:
A. Nechin, American Automatic Devices Co., Throop & Congress Sts., Chicago, Ill.

Lined Bearing Mfg. Institute:
J. M. Reynolds, Chairman, Federal Mogul Corp., Detroit, Michigan.

Locks:
George Brill, Mitchell Specialty Company, Holmesburg, Philadelphia, Pa.

Magneto Manufacturers Group:
W. N. Shaw, Eisemann Magneto Company, 60 East 42nd St., New York, N. Y.

Manufacturers Institute of Automotive Electrical Replacement Parts:
Joseph Gooch, Jr., Director, 369 Lexington Ave., New York, N. Y.

Clutch Plate Group:
C. M. Burgess, Chairman, Burgess-Norton Mfg. Co., Geneva, Illinois.

Gasket Group:
C. C. Secrist, Chairman, Victor Mfg. & Gasket Co., Chicago, Ill.

Leaf Spring Institute:
J. H. Shoemaker, Sec'y, Box 16, MJ Station, Detroit, Michigan.

Metal Moulding Mfg. Group:
S. D. Murphy, Chairman, John Lees Company, Indianapolis, Ind.

Oil Filter Group:
J. A. Graham, Chairman, Motor Improvements, Inc., 365 Frelinghuysen Ave., Newark, N. J.

Piston & Pin Mfg. Group:
A. G. Drefs, McQuay-Norris, St. Louis, Mo.

Piston Ring Group:
Lothair Teetor, Chairman, Perfect Circle Company, Hagerstown, Ind.

Powdered Metal Bearing Group:
W. J. Jennings, Chairman, Bound Brook Oil-less Bearing Co., Bound Brook, N. J.

Rebabbitters Group:
F. J. Dvorak, Clawson & Bals, Inc., 4701 Lake St., Chicago, Illinois.

Replacement Bronze Bushing Group:
C. W. McDaniels, Aluminum Industries, Cincinnati, Ohio.

Shop Equipment Associates:
J. A. Laansma, Sec'y, Fisk Building, New York, N. Y.

Spark Plug Associates:
Raymond P. Lipe, Chairman, Defiance Spark Plug Co., Toledo, Ohio.

Radiator and Gas Tank Cap and Ornament Group:
A. Nechin, American Automatic Devices Co., Throop & Congress Sts., Chicago, Ill.

Sun Visor, Defroster Shield and Wind Deflector Manufacturers:
A. Nechin, American Automatic Devices Co., Throop & Congress Sts., Chicago, Ill.

Transmissions:

Automotive Metal Trunk Ass'n:
G. D. Shanahan, Motors Metal Mfg. Company, 5936 Milford Ave., Detroit, Mich.

Tube Group:
Chas. E. Miller, Miller-Shelby Products Div., 9450 Buffalo Blvd., Detroit, Mich.

Universal Joint Group:
W. J. Smith, Chairman, Cleveland Steel Prod. Co., Cleveland, Ohio.

Valve & Valve Parts Group:
L. P. Drake, Jadson Motor Products Company, Bell, California.

Water Pump Group:
C. W. McDaniels, Aluminum Industries, Cincinnati, Ohio.

Wheel & Rim Group:
S. Berkowitz, Berkley Mfg. Company, 252 Genesee St., Utica, N. Y.

Windshield Wipers:
Anderson Company, Gary, Indiana.

France Taxes Automobiles to Cover Rail Deficit

FRENCH railroads during 1932 had an aggregate deficit of roughly 200 million dollars, and, as has been necessary many times in the past, the Government had to come to their assistance financially. The railroads ascribe their troubles principally to growing automobile competition and have prevailed on the Government to curb this competition by proper "regulation" of motor traffic. A law was passed on February 28 last which increases the annual taxes on all sorts of road vehicles, and the additional revenue derived from these increased taxes are expected to offset the deficit of the railroads which the Government had to make good.

These increased taxes naturally bear heavily upon road transport, and the motor interests have decided to fight these additional impositions. A pamphlet has just been issued by the National Federation of the Automobile, Bicycle, Aircraft and Allied Industries, under the title "Les Transports au Service Mais Non a la Charge de la Nation" (Means of Transport for Service but not at the Expense of the Nation). In this it is shown that railroad financial crises have been periodical in France, having occurred about once every ten years, and the Government, looking upon the railroads as public utilities, has regularly come to their financial assistance. This system of paternalism, it is asserted, has resulted in inefficient management. That the growth of automobile transport is not the primary cause of the financial difficulties of the railroads is indicated by the fact that both passenger and freight traffic of the railroads increased continually from 1920 to 1929 and remained practically on the same level during 1930. During this same period automobile traffic on French highways grew enormously, as indicated by indexes of 100 for 1923 and 1930 for 1931.

It is figured by the authors of the pamphlet that the additional revenue of 600 million francs, which is expected from the increased automobile taxes per year, will balance the railroad deficit for only 50 days. The new taxes hit particularly hard the commercial motor haulage enterprises, which, it is asserted, in some cases pay taxes amounting to 25 per cent of their gross receipts. Some of the truck owners sought to lower their operating cost by using gas oil as fuel, and then Parliament, in spite of protests, voted a tax of 360 francs per ton on this fuel, thereby stopping not only nearly all of the vehicles using it but also causing the closing of factories engaged in producing Diesel engines.

The authors make the point that in the best interest of the nation it is necessary above all to reduce the cost of transportation, by pursuing a policy assuring cheap coal and cheap motor fuel. The taxes which the Government may lose on these raw materials it will regain, and much more besides, as a result of increased industrial production.

50 Per Cent More Speed at 1/5 the Horsepower

CONCLUDING a tour of 3000 miles overland from Philadelphia to Fort Worth, Texas, the air-conditioned, stainless steel, two-car train built by E. G. Budd Mfg. Co. for the Texas and Pacific R. R. has been placed in main-line service between Texarkana and Fort Worth in Texas, a run of 500 miles.

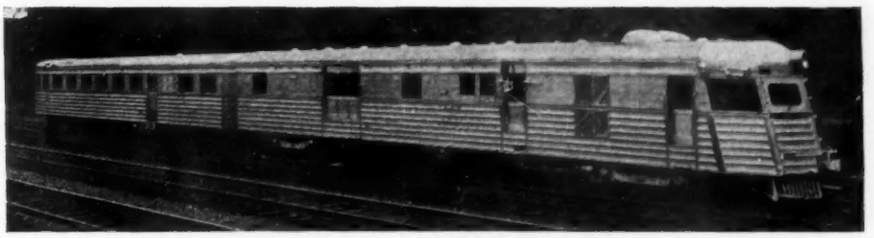
In a trial run over the lines of the Michigan Central from Buffalo to Detroit, the train followed the schedule of the crack "Wolverine Limited" and bettered its time.

Gasoline-propelled, it is said to provide 50 per cent more speed than the two-car steam train it is replacing, with 1/5 of the horsepower and at half the operating cost.

The train is capable of a maximum speed of 80 miles per hour and has luxurious seating and baggage accommodations for 76 passengers. The forward, or operating car, carrying no passengers, contains the two 240 hp. American-LaFrance gasoline engines and all propulsive machinery for the entire train in addition to the electrical apparatus, the air conditioning equipment, the 15-foot railway postal compartment and a large baggage room. The only wood used in the train is in the replaceable maple floor boards and some of the postal equipment in this car which rides on two 4-wheeled steel tired trucks each carrying two 300-volt Westinghouse motors. This car weighs 80,000 lb.

The rear passenger carrying car weighs, complete, 24,000 lb., with an observation space in the rear with six leather upholstered seats. Each car is 68 ft. long outside. The headroom in the passenger car under the lighting and air-conditioning ducts is 6 ft., 8 in.

The braking on the rear car is of Bendix-Westinghouse automotive type with drums on each of the 16 wheels, four on each truck and is of special design for this train, controlled by the Westinghouse air brake S.M.E. system. Braking on the front car is by railroad clasp type with brakes on all eight wheels through brake cylinders mounted on the frames of both front and rear trucks.



Two-car air-conditioned, stainless steel train built by E.G. Budd Mfg. Co., for the Texas & Pacific R. R. The entire train weighs only a little over 100,000 lb. Powered by two 240 hp. American LaFrance gasoline engines

Quieter "Silent" Transmissions Await Further Re

Part I

Part 2 will appear in a future issue of Automotive Industries

IS the "silent" transmission still too noisy?

That this seeming paradox is a source of real worry to production men is evident from a reading of Fred W. Cederleaf's paper, "Quieter Gears Are Being Demanded! How Shall We Make Them?" which was presented at the International Engineering Congress.

One is forced to conclude in the light of evidence presented in both the paper and the discussion it occasioned, that—

1. The production department will have exhausted its resources when it has adopted modern manufacturing equipment and production methods.

2. Some definite limitation must be imposed on the term "silent" within the possibilities of the present state of the manufacturing art.

3. Further improvement, under present conditions, must be shouldered by designing engineers rather than the factory.

With the thought that an impartial analysis of the situation might be of some assistance to both the engineer and production man, we propose to discuss it from two distinct viewpoints. The first, to be the subject of this article, deals with the acoustical considerations which seem to be of controlling importance. The second, to be the subject of a later article, will be a survey of the modern production equipment commercially available today.

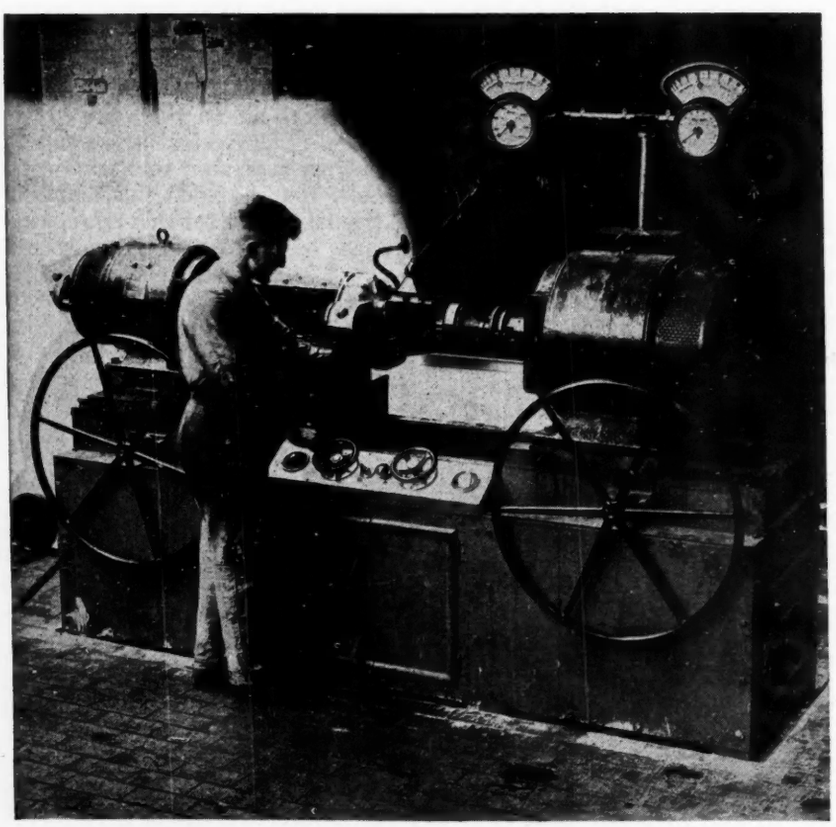
Before the production department can throw the problem into the laps of engineers, however, it must make sure that its equipment and methods are indeed in keeping with the progress of the art and not adaptations of old, inefficient or inaccurate tools, incapable of doing the best job even if the design were radically changed.

Assuming that the production department is limited by the results obtained through the use of modern equipment and methods of control, further progress seems to depend upon developments and refinement in engineering design as well as a more decisive attack on the acoustical considerations.

That the acoustical problem is of controlling importance was brought out in the study [1, 2] published in *Automotive Industries* last year. Quoting from Part 1 we find that an influential group of experts recommends an attack of the problem along the following lines:

1. That specifications for noise measurements on automotive units should proceed from the analysis of the behavior of a given unit as assembled in the finished car.

2. That noise specifications for the same unit may vary with changes due to installation in a different running gear or a different body, or a different make of car.



Highfield Electrical Co. (England), gearbox testing machine uses electrical method of picking up and indicating noise. Information is indicated on the meter mounted on the wall in the background

[1] Measurement of Noises Segregated from Din of Confusion, by Joseph Geschelin, *Automotive Industries*, November 26, 1932.

[2] Measurement of Segregated Sounds Enters the Fight for Noise Abatement, by Joseph Geschelin, *Automotive Industries*, December 3, 1932.

by Joseph Geschelin
Engineering Editor,
Automotive Industries

Research in Acoustics

After production men have taken full advantage of modern equipment, the problem becomes one of design and for its solution more intimate knowledge of the vibrations involved is essential

3. That the ultimate inspection device is quite likely to be an analyzing instrument having either a wide range as in the case of commercial machines or a narrow selective range if developed for individual problems.

4. That the specification must recognize the personal reaction of car owners as well as inspectors in setting the original standard.

5. That specifications must be treated as individual problems unique for each mechanism or machine or complete car.

6. Finally that specifications not only are desirable but an absolute essential to engineering development and economical manufacture.

The reason for this program is not difficult to understand. In the first place under present conditions the criterion of acceptance of the finished transmission usually is the ear of the final inspector. So we are up against a rather variable standard since the judgment of different inspectors can't be uniform and as a matter of fact the judgment of the same individual may change somewhat during the course of the day.

As E. J. Abbott[3] expresses it, "One's judgment of the loudness or objectionability of a sound is very g r e a t l y influenced (often entirely unconsciously) by how he thinks it should sound. If one recognizes that a certain sound comes from normal functioning of an essential part, he is very tolerant of it, and vice versa for sounds which are not thought to be essential. Many of the users of automobiles do not know which are the essential sounds and their judgments are different from those of the builder."

Consequently even if the builder sets what seems to be a good standard, it may be no good from the point of view of the user, and thus the standard should also comprehend user reaction.

Perhaps the most troublesome elements in the situation are these: a transmission which has been painstakingly built and seemingly quiet on a test stand is rejected because the inspector finds it is too noisy in the car; again, a transmission which is really satisfactory in one make or model of a given line is noisy when installed in a different chassis. Acoustical re-

(*Turn to page 649, please*)

[3]Research Physicist, University of Michigan, recent unpublished correspondence.

G.M.R. model in clay showing three-dimensional picture of a sound spectrum. Board at the right, "before"; B, "after." Peak at A was the only offending frequency when tested in a car

SHOCK ABSORBER PERFORMANCE

THE performance of shock absorbers as fitted to passenger automobiles must be considered with reference to the following effects:

a. The principal function of shock absorbers is to damp out spring vibrations quickly and gently; this function must be accomplished regardless of the amplitude of the vibrations.

b. Shock absorbers affect the amount of shock energy transmitted to the car body. Such transmission of shock causes discomfort to passengers, and the amount of energy transmitted should be as small as possible.

c. The forces on the car due to road shocks are affected, and they should be as small as possible.

d. The comfort of passengers depends upon the frequency and the magnitude of the movements to which they are subjected (amplitude, velocity, acceleration, and jerk of movements). The shock absorbers have an effect on all of these. Amplitude and velocity of the movements are proportional to the square root of the vibration energy transmitted to the car by the shock. Acceleration is proportional to the force acting on the frame. Jerk is the rate of change of acceleration.

e. When the car hits an obstacle, the particular wheel involved is likely to bounce, and the duration of the bounce (interruption of contact between wheel and road) is influenced by the shock absorbers. It should be as short as possible, because the safety of operation is dependent on contact between wheels and road.

The effects of different types of shock absorber will be considered with respect to all of these actions. As regards obstacles, it will be sufficient to consider one form of protuberance and one form of depression.

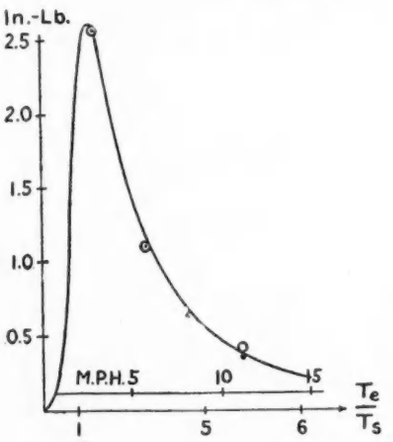


Fig. 2—Comparison of calculated residual energies.

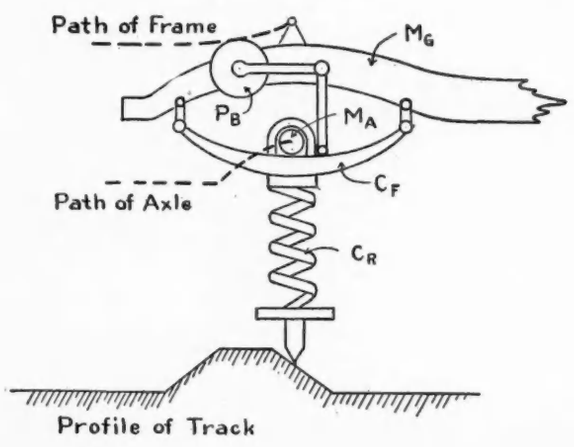


Fig. 1—Diagrammatic representation of the vibrating system.

Shock absorbers may be divided into three classes according to direction of action, viz., (1) those which offer resistance to recoil only; (2) those which offer resistance to spring deflection only, and (3) those which offer equal resistance to motion in both directions. Double-acting models which offer more resistance in one direction than in the other may be investigated by analogy with these main groups.

Aside from this classification, shock absorbers may be classified according to whether the resistance, P, they offer to spring action varies with the position (x) of the torque arm, with the velocity (v) of the arm, or with both. There are two main groups, in the first of which (hydraulic damping) the resistance varies with the velocity, and in the second of which (dry friction) it is independent of the velocity. Both groups may be subdivided according to the approximate form of the function

$$P = k\, x^n v^n,$$

in which k is a coefficient and n a positive number. The basic types of shock absorbers are characterized by the following equations:

$P = k$	Dry friction (Hartford) type.
$P = k\,x$	Friction increases with displacement from neutral position. Such shock absorbers are used on some French cars. It must be remembered that with a change in load the neutral or normal position of the spring also varies. The neutral position of the shock absorber (x=0) corresponds to the equilibrium position of the spring only for one definite load.
$P = k\,x^n$	Certain strap and drum-type shock absorbers in which the resistance increases faster than the displacement.
$P = k\sqrt[n]{x}$	No commercial example in existence.
$P = k\,v$	Hydraulic dampers in which the resistance varies in direct proportion to the velocity.
$P = k\sqrt[n]{v}$	Hydraulic dampers in which the resistance varies less rapidly than the velocity. This is the conventional modern type of hydraulic shock absorber, fitted with a spring-loaded relief valve which opens when the pressure on the liquid attains a certain value.

A general analysis of the spring control problem and the results to be expected with different types of energy absorbing devices

By Dr. Eng.
Henry O. Fuchs

In this article the author investigates the characteristics of shock absorbers of practically all the different types that have been actually produced and suggested. A shock absorber is essentially a device for converting kinetic energy into heat energy through the medium of friction. The frictional resistance of the absorber may be either constant, or it may vary with the displacement from the neutral position or with the velocity of the movable members of the device. Shock absorbers, moreover, may be active during recoil only or during both compression and recoil. The principal object of the shock absorbers is to damp out vibration of the sprung mass of the car after the wheels have struck an obstacle, thereby improving the riding qualities, but there are several incidental effects, and these are fully investigated for the different shock-absorber types.

$P = k\,v^n$ Hydraulic dampers in which the resistance varies more rapidly than the velocity.

$P = k\,v\,x$ A type of shock absorber in which the resistance varies with both the displacement and the velocity; this characteristic is possessed by certain cam and lever types.

Actual shock absorbers never conform exactly to these basic types. To get an idea of their exact performance it is a good plan to construct a graph showing their resistance as a function of displacement and velocity. The simple mathematical formulae given in the foregoing are very convenient, and in the main sufficient for classifying and judging the performance of shock absorbers.

In the following analysis the movements of one wheel only, which is considered to be independent of the others, are considered.

The car may be represented by the model illustrated in Fig. 1, whose parts are considered to have motion in one direction (along one of the axes of the coordinate diagram) only. Movements resulting from the reactions of one wheel upon another, from the inclination caused by lifting the wheel at one end of the axle, and from variations in speed (dipping of the forward part of the chassis when the wheels strike an obstacle) are neglected. Furthermore, springs and tires are assumed to have constant rates of elastic deflection. A critical study of these assumptions has shown that they are in accord with the results of experiments.

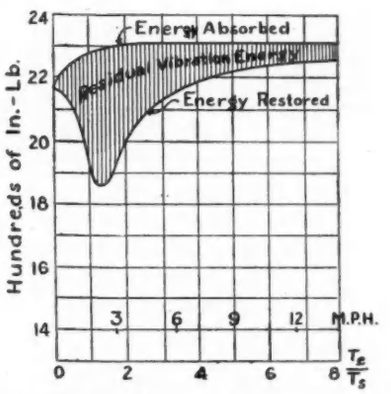


Fig. 3 — Energy balance for passage over the described obstacle at different speeds, disregarding tires and axle.

In a study of the spring action of a car a knowledge of the amounts of energy involved is essential. Only the amounts of energy associated with vertical motions of the axle, tire and frame will be considered here, and will be referred to as "vibration energy." Dissipation of vibration energy is the principal function of the shock absorbers. The latter, however, also have an influence on the amount of vibration energy transmitted to the car by a shock. By increasing the amount of energy transmitted to the car, the shock absorbers may produce results directly opposed to the purpose for which they are fitted, while by decreasing it they may control vibration at the origin more effectively than by dissipating the energy after it has been transmitted.

Vibration energy transmitted to the car during shock is drawn from the engine or from the store of kinetic energy of the moving car and its rotating parts. The shock produced by a protuberance on the road surface can be divided into two phases. During the first of these, vibration energy is abstracted from the store of kinetic energy of the car *due to its forward motion*, and the rotary motion of its parts; during the second, a part of this energy is restored, adding to the kinetic energy of forward motion. The remainder, residual energy, must be dissipated by the shock absorbers.

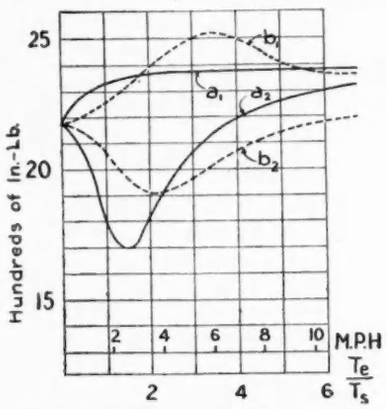


Fig. 4 — Energy balance with damping on compression only.
a_1 and a_2, energy absorbed and restored, respectively, without damping.
b_1 and b_2, energy absorbed and restored, respectively, with a damping force of 220 lb. on compression only.

The first phase corresponds to mounting of the obstacle by the wheel; during this phase the road exerts upon the wheel a pressure opposite in direction to the motion of the car. The second phase corresponds to the descent of the wheel from the obstacle. By pressure exerted on the wheel in the direction of the car's motion, energy is restored to the car and withdrawn from the vibration energy. When the wheel is out of contact with the road, no transformation of vibration energy into kinetic energy of forward motion is possible. Therefore, when the wheel bounces over the downslope of the obstacle, the second phase of the shock disappears entirely.

Quantities of vibration energy can be computed by a number of different methods. They are determined by the height and shape of the obstacle, the "rates" of elastic deflection of the springs and tires, the sprung and unsprung weights, the ratio T_e/T_s of the natural period of vibration of the sprung mass to the duration of the passage of the wheel over the obstacle, and the performance of the shock absorbers.

In Fig. 2 the vibration energy at the end of the shock is plotted against the ratio T_e/T_s. The car is assumed to have no shock absorbers. This chart shows the results of three different methods of computation, as follows: (1) The curve computed by Dr. Geiger* for an obstacle of the profile of a sine curve; (2) points obtained by graphical integration of the path of the axle and sprung weight, and by addition of the energies of axle, tire, spring and sprung weights; (3) points obtained by considering only the spring and the sprung weight. For the graphical integration the profile of the obstacle was assumed to be a symmetrical quadrilateral instead of a sine curve. Results obtained by the three methods agree remarkably well.

The energy represented in Fig. 2 corresponds to the difference between that taken from the kinetic energy of the car in the direction of motion and that restored to the car. Fig. 3 shows—for a car without shock absorbers—both of these items plotted against the ratio T_e/T_s. The difference between the two curves of Fig. 3 corresponds exactly to the curve of Fig. 2. Fig. 3 shows that as regards amount of residual energy, both phases of the shock are of equal importance.

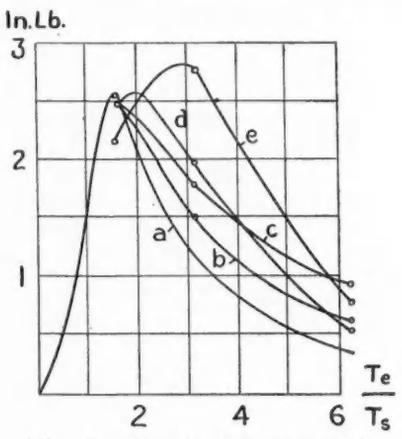


Fig. 5 — Residual energy with different degrees of damping on compression only.
a, without damping according to Geiger; b, ⅛ aperiodic; c, ¼ aperiodic; d, 110 lb. friction; e, 220 lb. friction.

In two extreme cases no vibration energy is left in the system. First, at very low speeds both sprung and unsprung weight will follow the profile of the obstacle exactly, for a distance equal to the length of the obstacle. The pressure between road and vehicle will then be constant, and exactly the same amount of energy as absorbed from the car will be restored (a symmetrical obstacle being assumed). Secondly, if the car is being driven at very high speed, or if the obstacle is very short, only the tire will be deflected and the axle and frame will not be lifted. The pressure on the road will then be determined only by the height of the obstacle, and will be the same at symmetrical points on the up and down slopes. Therefore, the path integrals of the forces exerted against and with the forward motion of the car will be equal and their difference, the residual vibration energy, will disappear. At all intermediate speeds, vibration energy will be left after the shock, depending mainly upon the ratio of the duration of the shock (duration of passage over the obstacle) to the natural vibration period of the car upon its springs, as shown in Figs. 2 and 3.

The influence of shock absorbers on the balance of energy is shown in Figs. 4 to 8. In these figures, the amount of energy is plotted against the ratio T_e/T_s, and, besides, the speed corresponding to these ratios is given. This speed is computed under the assumption of a natural vibration period of one second and a protuberance raising the wheel while the vehicle travels 31.5 in. This length is greater than the actual length of the obstacle, depending on the wheel radius and the tire pressure. The amounts of energy shown were calculated by making the following assumptions: Height of obstacle, 2 in.; unsprung weight, $m_A = 220$ lb.; sprung weight, $m_G = 1100$ lb.; rate of spring,

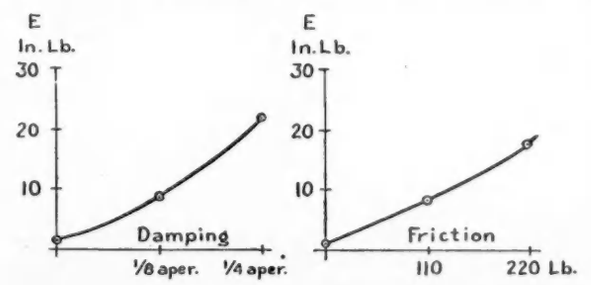


Fig. 6 — Residual energy, considering the tire-suspended mass, $T_e/T_s = 20$ and different degrees of damping.

* Dr. J. Geiger: Der Einfluss der Daempfung auf das Verhalten des Wagens, Automobiltechnische Zeitschrift, Vol. 34 (1931), p. 56.

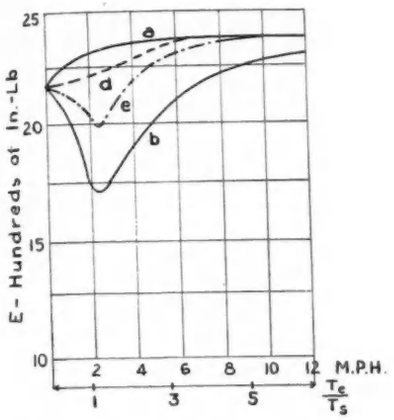


Fig. 7 — Energy balance for damping on recoil only. *a*, energy absorbed; *b*, energy restored without damping; *c*, energy restored with damping on recoil only, one-quarter aperiodic; *d*, energy restored with a damping force of 220 lb. on recoil only.

$c_F = 112$ lb./in.; rate of tire, $c_R = 1120$ lb./in.

Figs. 4, 5 and 6 show the effects of single-acting shock absorbers which resist spring deflection only. As may be seen from Fig. 4, they increase the amount of energy which is absorbed and diminish the amount which is restored, except at very low speeds and with very long obstacles. Fig. 5 is a comparison between dry friction ($P = k$) and hydraulic damping ($P = k\,v$). At low speed the dry friction is more effective; at high speed, the hydraulic action. In a general way the effects of both are similar. Fig. 6 shows how different frictional forces and different hydraulic damping actions affect the amount of residual energy at high speeds. The damping force $P = k\,v$ is measured by the ratio f of the factor k to the coefficient $k_{ap} = 2\sqrt{m_G\,c_F}$. The coefficient k_{ap} is the one denoting the limit between periodic and aperiodic damping of the motion.

Fig. 7 shows the influence of single-acting shock absorbers which control recoil only. They have no effect on the amount of energy absorbed, but they increase the amount of energy restored to the forward motion of the car, thereby diminishing the amount of residual energy, which is desirable. At higher speeds these shock absorbers do not affect the amount of transmitted energy at all, as the shock is over before the recoil of the spring begins, and the wheel then bounces over the down slope of the obstacle.

Fig. 8 shows the effects of three kinds of shock absorbers, viz., those acting on recoil only, those acting on deflection only, and those acting equally in both directions. The curves show that when passing over a protuberance—a raised obstacle — single-acting, recoil-controlling shock absorbers are most effective (with regard to reducing the amount of vibration energy absorbed). Deflection-controlling shock absorbers increase the amount of residual energy, and therefore are undesirable. Double-acting shock absorbers also increase the amount of residual energy, but not nearly as much as single-acting ones.

This applies to protuberances or obstacles protruding from the road surface. For depressions (pot holes or ditches) the exact opposite holds true, that is, deflection-controlling absorbers reduce the amount of residual energy, while recoil-controlling absorbers increase it. It must be remembered in this connection that for a depression exactly symmetrical with a protuberance, the ratio T_r/T_s is greater, for the reason that the depression affects the path of the axle for a longer period, corresponding to a greater distance of car travel, as shown in Fig. 9.

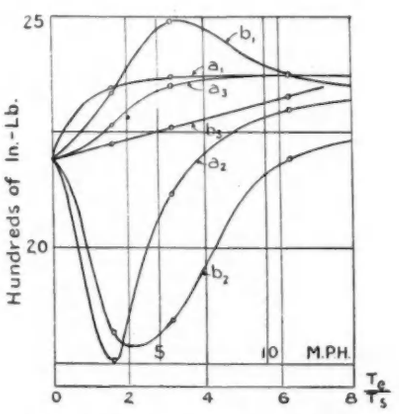


Fig. 8 — Energy balance for damping in different directions.
a_1 energy absorbed without damping and with damping on recoil only.
a_2 and a_3, restored energy without damping and with damping on recoil only, respectively.
b_1, absorbed energy with damping on compression only.
b_2 and b_3, restored energy with damping on compression and recoil only, respectively.
Damping force 220 lb. in each case.

As regards the balance of energy, every type of shock absorber has advantages and disadvantages. However, shock absorbers which control recoil only possess more advantages and fewer disadvantages than those which control deflection only. Recoil-controlling absorbers are at a disadvantage on the down slope of a protuberance. The wheel never bounces over the up slopes, but hits them harder the higher the speed.

In extreme cases a double-acting absorber is less objectionable from this point of view than a single-acting, recoil-controlling unit, but it will not have the beneficial influence which the single-acting absorber has at normal speeds.

Forces and Accelerations

Single-acting, recoil-controlling shock absorbers have no influence on the maximum force exerted on the frame, as they act in a direction opposite to that force. Shock-controlling absorbers, on the contrary, can add considerably to the maximum force. The additional force due to this action is easily calculated for the case of frictional shock absorbers, which have the same effect as stiffening the springs. However, the increase in the maximum force on the frame is appreciable only if the resistance increases rapidly with spring deflection ($P = k\,x^n$).

For hydraulic shock absorbers it is more difficult to compute the maximum force exerted on the frame. To provide a basis of comparison it is assumed that the

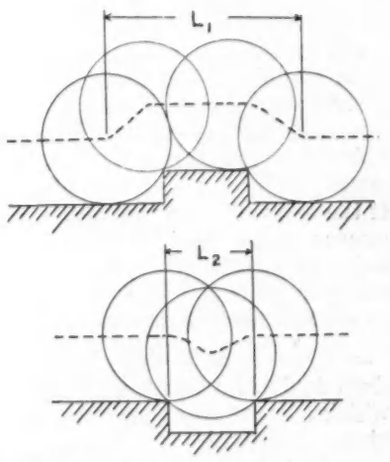


Fig. 9 — Showing the different effects on the axle path of protuberances and depressions of equal cross-sectional dimensions.

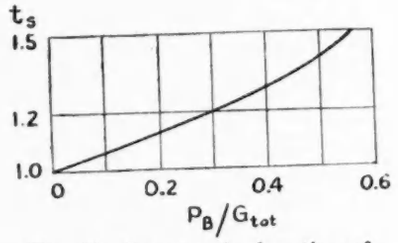


Fig. 10—Increase in duration of bounce by friction damping.

wheel drops from a step of such height that if no shock absorber were used the spring would deflect to the limit of its free movement. The force which the spring exerts on the frame under these conditions is

$$P_F = c_F a,$$

where a is the maximum deflection provided for in the design of the car.

The force exerted by a hydraulic shock absorber depends upon the velocity of the movement. If it is directly proportional to the velocity, as will be assumed here, it is expressed by the equation

$$P = 2 f \sqrt{c_F m_G}\, v$$

If the coefficient f is equal to 1, the damping is just sufficient to damp the motion aperiodically. The maximum force is exerted by the shock absorber when the velocity has its maximum value, which latter can be calculated from the energy equation—

$$m_G V_{max}^2 = c_F a^2$$

The ratio of the maximum force exerted by the shock absorber to the maximum force exerted by the spring is then

$$P_B/P_F = 2f$$

If the shock absorber action is relatively weak ($f < 0.5$) the force exerted on the frame is less if the car is equipped with shock absorbers than when it is not. If the shock absorber action is stronger, the force on the frame will be increased.

If the force of the shock absorber increases more rapidly than the speed, the effect is worse. It is much preferable to have the action increase less rapidly than the speed ($P = k \sqrt[n]{v}$), as it does in most modern hydraulic shock absorbers, in which a relief valve prevents excessive pressures on the liquid.

Summing up, shock absorbers which control spring deflection add to the maximum force on the frame, except when their resistance depends on the velocity of movement and does not increase too rapidly with the velocity.

Jerks

For maximum riding comfort, the amplitudes, velocities, accelerations and jerks of vibration should be as small as possible. The energy and forces of vibration having been discussed in the foregoing, it remains only to consider the subject of jerk. The jerk is represented by the equation

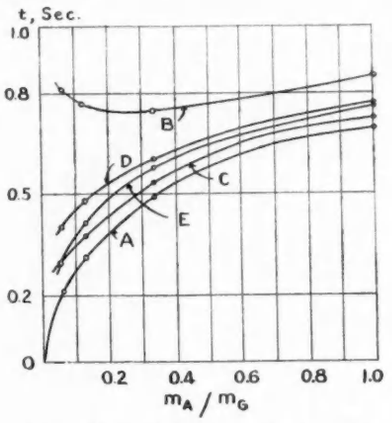


Fig. 11 — Duration of bounce with different degrees of damping and different values m_A/m_G. *A*, without damping; *B*, $m_G P_B = 2\sqrt{m_G c_F}\, v$; *E*, aperiodic with relation to one-quarter aperiodic with relation to m_G; *D*, one-half aperiodic with relation to m_G, *E*, broken characteristic.

$$R = \frac{d^2x}{dt^2} = \frac{l}{m}\frac{dP}{dt}$$

and is therefore equal to the quotient obtained by dividing the rate of variation of the force by the mass. The importance of this factor from the standpoint of riding comfort, alongside of the factors of displacement, velocity and acceleration (x, dx/dt, and d^2x/t^2) has been shown on theoretical grounds by Baillie[1], Melchior[2], and others, and has been confirmed recently by Reiher and Meister.[3]

In a car without shock absorbers, if the springs vibrate with an amplitude a, the maximum jerk is

$$R_G = a_G \omega^3,$$

where ω_G is the natural frequency of vibration in angular velocity measure—

$$\omega = \sqrt{\frac{c}{m}}$$

If the axle vibrates with an amplitude a and its natural frequency is ω_A, the jerk of the car (frame and body) is

$$R_A = a\omega_A\omega_G^2$$

Since ω_A is from 5 to 15 times as large as ω_G and the amplitude of the axle is usually greater than that of the body, R_A is usually much more important than R_C.

A hydraulic shock absorber producing a damping force $P_B = 2f\sqrt{c_F m_G}$ adds a further jerk, not coinciding in time with that due to the springs, of a value

$$R_B = 2 f a \omega_A^1 \omega_G,$$

for an axle movement determined by ω_A and a.

The ratio of the jerk due to the absorber to the jerk due to the springs

$$R_B/R_A = 2f(\omega_A/\omega_G)$$

This means that the jerk resulting from the action of such a shock absorber may easily exceed the jerk of the car without shock absorber. In any case, a hydraulic shock absorber adds to the frequency of jerks, for the reason that the jerk resulting from the variation of the damping force is felt at the moment of maximum variation of axle velocity, whereas the jerk resulting from variation of spring force is felt at the moment of maximum velocity of the axle, which occurs one-quarter of a period before or after the shock-absorber jerk.

To reduce both jerks to a minimum, ω_A must be as small as possible, and since the unsprung weight must not be increased, this can be accomplished only by increasing c_R, that is, by using softer tires.

Dry friction also produces a jerk

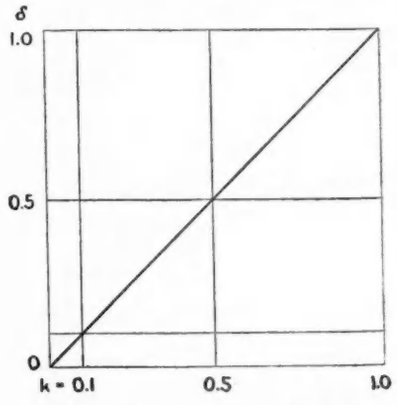


Fig. 12—Damping out of oscillations when damping follows the law $P_B = k\,c\,x$.

[1] G. H. Baillie; Springs, The Horseless Age, Vol. 32, p. 285, 1913.
[2] P. Melchior; Der Ruck, Zeitschrift des Vereins Deutscher Ingenieure, Vol. 72, p. 1842.
[3] H. Reiher and F. J. Meister; Die empfinlichkeit des Menschen gegen Erschuetterungen Forschung a.d. Gebiet des Ingenieurwesens, Vol. 2, p. 177.

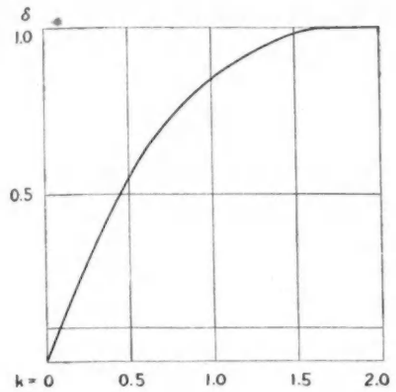


Fig. 13—Damping out of oscillations when unilateral damping follows the law $P_B = k\sqrt{m\ c}\ v$.

at the moment of minimum axle velocity. As the force changes abruptly with a change in the direction of motion, no numerical value can be given for the jerk $R = dP/\Delta t$ until the value of Δt has been determined by psychological experiments. As the jerk is felt at the moment of maximum displacement of the axle, a shock absorber whose resistance increases with displacement ($P = k\ x$) is particularly undesirable.

Another point which must be considered here is the jamming of the springs by friction against small forces. If r is the deflection of the spring corresponding to the force necessary to overcome the friction, an amplitude

$$a = r\ (c_B/c_F)^{1.5}$$

of spring deflection without friction would cause the same jerk as the spring with friction transmits to the car. For instance, if r = 0.8 in. and $c_B = 10\ c_F$, this amplitude would be a = 16 in. This shows how harmful jammed springs may be from the standpoint of jerk.

Shock absorbers therefore should be of such design that they will not jam spring action and that their resistance does not vary too rapidly with velocity.

Duration of Bounce

For the sake of safety and minimum wear and tear on tires and gears, it is important that the wheels always remain in contact with the road. When a car passes over an obstacle, a wheel may lose contact with the road for some time. This time interval—the duration of bounce—should be as short as possible.

The duration of a bounce decreases with the ratio of unsprung to sprung weight. Shock absorbers which check recoil increase the duration of bounce, because they slow down the downward movement of the axle. Friction increases the duration of a bounce in proportion to the ratio of the frictional force to the total sprung and unsprung weight. In Fig. 10 the increase in the duration of bounce by friction is plotted against that ratio.

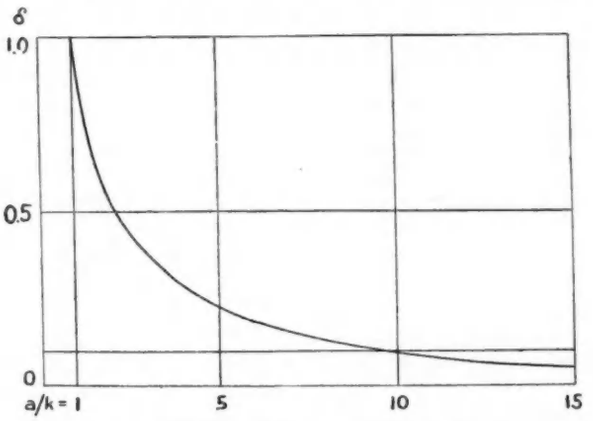


Fig. 14 — Damping out of oscillations with unilateral damping according to the law P = constant = $k\ c$.

Hydraulic damping may increase the duration of bounce even more than friction damping. To obtain some quantitative results with respect to the increase in the duration of bounce by hydraulic damping, this duration was calculated for different shock absorber resistances and different ratios of unsprung to sprung weight (m_A/m_G) for a bounce 2 in. high. A new method for graphically determining the movements with damping forces following any given law was used[1]. The results are shown in Fig. 11. Here the duration of the bounce is plotted against the ratio m_A/m_G. Curve A shows the duration when no shock absorber is used. Curve B shows the effect of a shock absorber whose resistance follows the law $P = k\ v$, and in which k is just large enough to damp out the movement of the frame and body relative to the axle aperiodically. Curves C and D show the effects of weaker shock absorbers of the same type, exerting only one-quarter and one-half as much force, respectively. Curve E shows the effect of a shock absorber with relief valve, so set that the force increases with velocity at the same rate as in the case of Curve D, but is limited to a maximum value of 330 lb.

Fig. 11 shows how the advantage of small unsprung weight from the standpoint of safety may be negatived by the use of shock absorbers, and how this counter effect increases as the unsprung weight is reduced. A good part of this loss can be avoided by using shock absorbers in which the maximum force is limited, or one in which it increases less rapidly than the velocity ($P = k \sqrt[n]{v}$). A shock absorber having the characteristic $P = k\ v^n$ would be even less desirable from this standpoint, since with it the duration would vary more rapidly than the height of the bounce.

Damping of Vibrations

Shock absorbers are fitted to dissipate energy of vibration by transforming it into heat, and thus damp out vibrations as rapidly as possible. This is necessary both to avoid discomfort due to vibra-

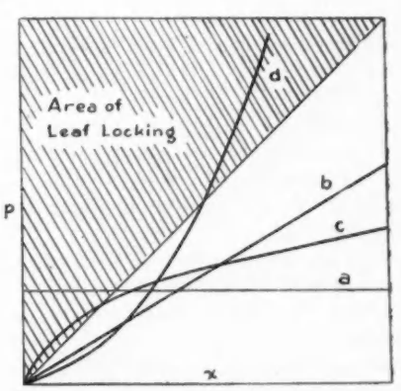


Fig. 15 — Locking of spring leaves when the damping varies with different powers of distance from the neutral position. a, $P = k$; b, $P = kx$; c, $P = k\sqrt{v}$; d, $P = k\ x^2$.

[1] H. O. Fuchs; Die Einfluesse von Schwingungsbremsen auf die Federung von Kraftwagen. Automobiltechnische Zeitschrift Jahrgang 36 (1933), Nr 9.

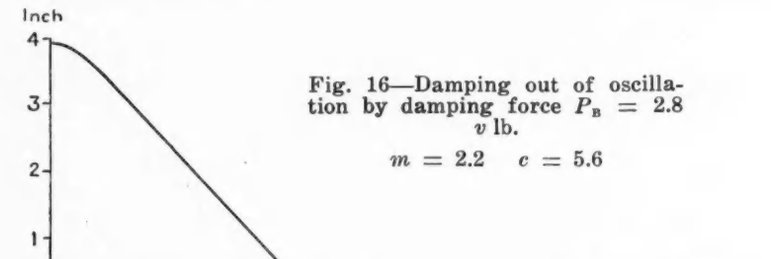


Fig. 16—Damping out of oscillation by damping force $P_B = 2.8\ v$ lb.

$m = 2.2 \quad c = 5.6$

tion and to lessen the probability of the wheel striking an obstacle while the spring is not in the neutral position.

The efficiency δ of a shock absorber is measured by the ratio of the energy dissipated during one vibration cycle to the energy contained in the vibrating system at the beginning of that cycle. This ratio should be constant or increase with the amplitude. When $P = k\ v$ and when it is $k\ x$, δ is not affected by the amplitude of the movement. Figs. 12 and 13 show the relation of δ to k for these two types of shock absorber. For dry friction ($P = k$), δ increases as the amplitude decreases. Fig. 14 shows the relation of δ to the amplitude, measured in multiples of the amplitude for which the spring force equals the friction force. It brings out the disadvantage of this type of absorber. Friction jams the spring if the amplitudes are above or below certain limits, except if the frictional force is directly proportional to the displacement. Fig. 15 shows these limits for different values of the exponent m in the equation $P = k\ x^m$. If m is greater than l, the spring will jam at high amplitudes only. Even with $P = k\ x$, jamming is difficult to avoid, as the equilibrium position of the spring varies with the load and corresponds to $x = o$ for one particular load only.

The damping rate due to a force varying with a power of the velocity can be easily determined by comparison with $P = k\ v$. For different velocities, different factors k_1 must be inserted in the equation $P = k_1\ v$, so that

$$k_1\ v = v^{m-1}\ k\ v = k\ v^m$$

The rate of damping produced by a force $P = k\ v\ x$ may be easily determined by a similar method. Vibration subject to a damping force following this law cannot exceed certain limiting values of amplitude and velocity, regardless of how fast the initial movement may have been. Fig. 16 is a displacement-time diagram of a vibration so damped and Fig. 17 is a displacement-velocity diagram for the same case. Displacement-velocity diagrams are rather uncommon, but are useful in the study of damped vibrations.

From the standpoint of efficiency of damping, shock absorbers having the characteristics $P = k\ v$, $P = kv^n$, $P = k\ x$ and $P = k\ x\ v$ are most advantageous. Double-acting shock absorbers are superior to single-acting ones from the viewpoint of damping out vibrations.

Summary

The design and selection of shock absorbers must always be a compromise between various conflicting requirements. No type is without its peculiar disadvantage.

It is impossible to arrive at the best type of shock absorber by merely adding the advantages and subtracting the disadvantages, since the various requirements are not of equal importance and their relative importance varies with the particular application. In the case of a racing car, for instance, the type corresponding to the law $P = k\ x$ is of advantage, as the load does not vary much and the jerks caused by this type are of less importance than the favorable effect on the duration of bounce. For private passenger cars this type would not be so well suited, on account of the jerks and the jamming of the springs caused by varying loads. Besides, the personal equation is a big factor in riding comfort, some people preferring short shocks without continued vibration, others a wave-like motion.

For average conditions those shock absorbers are best whose resistance varies with the velocity, is limited to a certain maximum, and act only on recoil, or much more on recoil than on deflection.

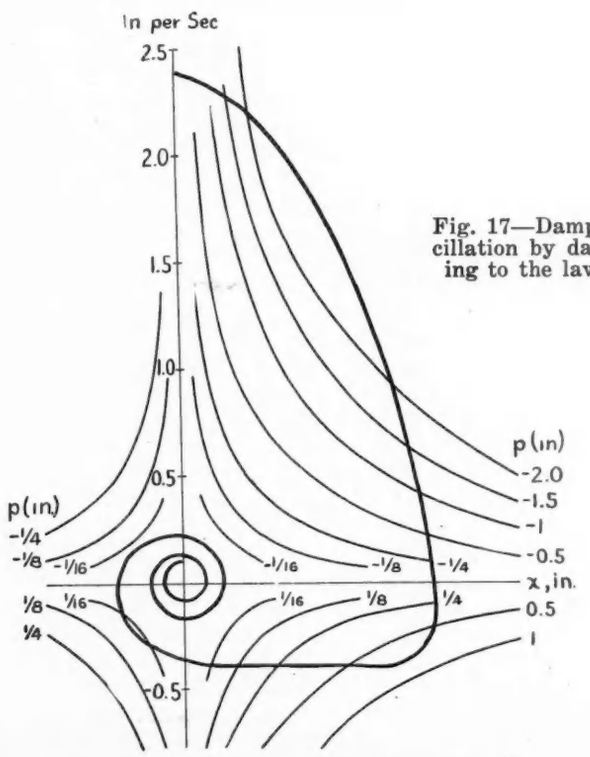


Fig. 17—Damping out of oscillation by damping according to the law $P_B = k\ x\ v$.

Quieter "Silent" Transmissions Await Research

(*Continued from page 641*)

search provides a reasonable answer to these perplexing situations and indicates a method of control.

Without going too deeply into the matter covered in our previous study, we can say that sound control is a very complex problem. To comprehend it we must look at it in its simplest terms. Thus we may say that in the complex sound pattern issuing from a transmission there are numerous frequencies within the audible range, others below the audible, still others above the threshold of hearing. Considering the transmission alone, it is silent to the ear if the sounds having frequencies within the audible range are of low intensity, i.e., practically of inappreciable loudness.

Under these conditions the sounds below the audible range are unimportant except insofar as they may cause vibration.

And by progressive refinement in design and manufacture of the various components it is possible, neglecting expense for the moment, to reduce the loudness of the sounds in the audible range so as to produce a very low noise level and by the same token to reduce the intensity of the sounds within the inaudible range so as to minimize vibration effects. The net result should be a quiet transmission.

But frequently when this perfected unit is mounted in the chassis much to our dismay it's noisy and disagreeable. Why?

Those Elusive Sounds

Consider it this way: tucked away in the complex sound pattern of the unit there is at least one and perhaps a number more frequencies of low intensity which now become important because of resonance or the sound-box effect of the body or some other part of the vehicle. Or it may be due to the intensification of harmonics already present somewhere in the car just awaiting some positive encouragement.

It is also possible for the sounds below the audible range to become important through reenforcement from other sources. If it comes from outside effects within the same frequency range, we may get vibration; if it combines with latent overtones or harmonics lurking elsewhere, we get new sounds in other parts of the vehicle.

Much of the disturbance due to reenforcement of sounds below the audible range may be avoided by the development of suitable transmission mountings designed to prevent the transfer of vibration from the transmission to the chassis and vice versa. This was the objective of the GMR study described in Part 2[2].

Resource of sounds in the audible range is a different story entirely. Suppose we discover resonance and then by means of scientific methods succeed in mapping the offending frequencies. Suppose, further, that means are found for suppressing or eliminating the source of this sound. Can the production man breathe a sigh of relief and turn his attention to some other trouble? Not by a long shot!

The Left Shoe on the Right Foot

If this transmission is being built by a supplier who is fortunate enough to have orders from a number of car makers and if he has made the foregoing refinements for car builder A, the chances are that when he makes the next shipment to car maker B, many of the units will be rejected, at least if the second car has characteristics of form or volume or something else that tends to make important the frequencies now suppressed in the new sound pattern of the refined unit.

All this seems to imply that the term "silent" covers a multitude of sins. Also that a "quiet" transmission taken by itself proves nothing about its behavior in the chassis. It would almost seem desirable, at least hypothetically, in the normal run of production to separate the completed units into different lots each of which is acceptable for a given set of conditions. One lot would suit car maker A perfectly; another would be poison to A but a sweet job for B.

The selection would have to depend upon the discovery of a suitable instrumentation designed to measure only those frequencies that are of importance in each case, which is easier said than done.

The interesting thing is that while the foregoing sounds more or less academic it pictures precisely what has happened in practice. This came to us rather forcefully in the discussion at the Chicago meeting when an executive of one of the large parts makers told us that some years back they were shipping the same type of transmission to two car makers—the rejects of one were just right for the other.

Thus in an elementary sort of fashion we perceive the real role of acoustical research. With scientific knowledge there is an effort at perfection in the way of eliminating all sounds—of attempting to level off every peak in the complex sound pattern emitted by the gear-box. This is indeed an arduous and expensive proceeding. Perhaps some of this labor could be saved if we knew exactly which things are important and which are not. Incidentally, the experience of GMR is that when you level off a certain peak you usually level off a lot of others around it in one fell swoop.

Maybe there is more to this business of acoustical research than we think. If there is, something ought to be done about it before the production man throws in the sponge. Maybe the necessary scientific work plus some engineering changes will make it possible to produce acceptable transmissions only with the aid of the present available production equipment of modern design and without recourse to special or costly methods. At least the whole thing would be placed on a sounder and more economical basis.

When quieter transmissions are demanded—how will we build them? By applying scientific principles to the problem and relieving the production department of every care except that of building the component parts to given specifications, recognizing at least the following requirements:

1. Decision as to the type of noises to watch—their frequency and intensity.
2. Specific instruments and equipment for mounting, the exact location of microphones, etc.
3. Standard of comparison based on the same kind which are satisfactory under operating conditions.
4. Establishment of adequate tolerances on standard figures.

Independent Front Wheel Suspension to Feature All GM 1934 Cars—Prices Higher

Sloan Describes New Construction as "Knee Action"—Coil Springs to Be Used with Chevrolet Design Different from Other Lines—Code Adds $23,000,000 to GM's Annual Payroll

NEW YORK—Independent springing will be applied to the front wheels of all General Motors 1934 cars, Alfred P. Sloan, president, announced here this week. Prices will be higher, he said, and all lines will be in production by the time of the New York show. He does not anticipate further manufacturing stoppages due to labor disturbances.

All the General Motors cars will be roomier next year, he stated, indicating that body lines would not be altered radically although further trend toward streamlining would be in evidence.

"Knee-action wheels" is the terminology which General Motors will use to explain simply and aptly the functioning of independent wheel suspension. "Each front wheel will be attached individually to the chassis by its own soft spring," Mr. Sloan said. "When it encounters a bump or hole it will rise or fall independently, as your leg is lifted or straightened by its knee without affecting your other leg or the equilibrium of your body. Two types of independent suspension, both utilizing coil springs, will be found on the General Motors cars, the method of application on Chevrolet differing somewhat from that of the other lines. "We believe in giving the engineers of each unit a chance to work out their individual ideas in design wherever possible," Mr. Sloan stated.

Answering queries at the time he made the independent wheel suspension announcement, Mr. Sloan commented on the automobile codes and on the business effects of recognition of Russia.

If the automobile dealer code involving standardized used car allowances can be worked out successfully, he said, it will be very helpful to retailers, but he felt that fewer advantages are to be gained by manufacturers from their code. "Because the automobile industry has 'shared-the-work' to the utmost throughout the depression, the NRA code provisions do not make major changes in operations in that respect," he pointed out.

Operation under code requirements will add about $23,000,000 a year to General Motors expenditures in wages and salaries alone, Mr. Sloan said, pointing out that this amounts to about $30 per car. In addition, the Corporation will have to pay higher prices for parts and materials. These added costs will be primarily responsible for the increases in car prices, he stated, predicting in a very general way that something like 15 per cent advance might be expected.

"Sending an Ambassador to Russia," Mr. Sloan said, "doesn't necessarily mean that we are going to get several hundred million dollars worth of business. A proper plan is needed

(*Turn to page 655, please*)

Curtice Is Named Buick President

DETROIT—H. H. Curtice, recently appointed general manager of the Buick Motor Co., has in addition been named president of the company. W. F. Hufstader, general sales manager, has also been appointed vice-president. Before becoming chief of the Buick organization, Mr. Curtice was president of the AC Spark Plug Co., while Mr. Hufstader was Buick sales manager in the BOP regime.

Koether Reported Chief of GM Accessories Sales

DETROIT—B. G. Koether, formerly head of the central sales section of General Motors under R. H. Grant, has been appointed sales chief for the accessories divisions of the General Motors Corp., under C. E. Wilson, it is reliably reported.

NRA Will Step in Only Where Industry Fails

WASHINGTON—NRA wants to give the code authority of each industry as much regulatory power as possible, General Johnson explained this week. He made it clear, however, that the ultimate responsibility for enforcement rested with the recovery administration.

"NRA will supervise code administration by code authorities," the General said. "In addition, it will directly administer the code itself wherever an industry is unable to administer it, fails to administer it, or where there are certain functions of code administration, which, by their nature, government should perform directly."

It is expected that violations of fair trade practices in the main will be handled by the code authority, but the NRA representative sitting with the authority has the veto power which "is the substitute for the anti-trust laws in this set-up."

October Output of 142,157 Lifts Ten Months' Production in U. S. and Canada to 1,871,613

WASHINGTON, D. C.—October production of motor vehicles in the United States and Canada amounted to 142,157 as against 201,890 in September and 51,625 during October, 1932. This gives an increase over last year of 176 per cent, but at the same time shows a seasonal decline from September of this year of about 29 per cent.

Production for the first 10 months of 1933 was 48.5 per cent over that for the same period of 1932, and amounted to 1,871,613 as compared with 1,260,241 last year. An output of only 129,000 in November and December combined will put the industry over the 2,000,000 mark and there is now little doubt that this total will be exceeded by a comfortable margin.

Canadian output amounted to 3682 units in October as compared with 5808 in September and 2923 in October, 1932. Of the October production 2723 were passenger cars and 959 were trucks.

United States October production was 138,475 and consisted of 108,073 passenger cars and 30,402 trucks, compared with 196,082 in September and 48,702 a year ago.

A comparative summary follows:

	Total	Cars	Trucks
10 mos., 1933	1,871,613	1,558,555	313,058
10 mos., 1932	1,260,241	1,049,298	210,943
Oct., 1933	142,157	110,796	31,361
Sept., 1933	210,890	165,258	36,632
Oct., 1932	51,625	37,468	14,157

WS

Nov. Sales Estimates Revised Upward as Market Continues Relatively Strong

Retail Car Sales Now Expected to Exceed 100,000—Dealer Stocks of New and Used Cars Are Low—Rush to Buy Before Used Car Allowances Go Down Is Major Selling Factor

By Athel F. Denham

Field Editor, Automotive Industries

DETROIT—An upward revision in estimates of retail and domestic new car deliveries for November is indicated on the basis of scattered returns for the mid-month period. Present indications are that retail deliveries will exceed the 100,000 mark by a comfortable margin in spite of bad weather conditions prevailing in some sections of the country. Anticipation of reduced trading allowances under the used car code continues to deserve credit apparently in helping to maintain retail sales at a relatively high level.

In comparison with the rate of new car deliveries, new car stocks are lower than would be normally considered desirable in some instances. This lack of new cars, however, seems to have stimulated the cleanup on used cars by dealers with the result that used car stocks will be materially reduced during the next 30 days.

Sales by Dodge dealers for the first 18 days of November are slightly ahead of the same period in October. Week ending Nov. 18 showed deliveries of 1526 cars and 880 trucks, both cars and trucks representing material increases over the preceding week.

During the first 10 days of November Pontiac sales exceeded retail deliveries in the same 10 days of 1932 by 147 per cent, and were the largest for that period in any year since 1929.

Actual deliveries made by Dodge dealers between January 1 and November 11 amounted to 78,620 passenger cars and 21,848 commercial cars and trucks—making a total delivery volume of 100,468 Dodge vehicles. In addition, Dodge dealers also delivered 66,875 Plymouth Sixes. Retail sales for the week ending November 11, amounted to 3512 passenger cars and trucks, an increase over business recorded for the corresponding 1932 week of, 514 per cent.

Retail deliveries of Graham motor cars during the week of November 4, were greater in volume than during any week since September 23. October sales were well ahead of those a year ago and thus far November promises to hold its own with October. Sales in October were only ten per cent off from the volume in September.

During the first half of November, Studebaker shipped 4208 new 1934 models. This exceeds the first fifteen days of November, 1932, by 1056. It also exceeds any previous half-month period since February, 1932, twenty-one months ago as well as any previous first half of November period since 1927. Studebaker expects to have the biggest export passenger car business in November of any month since May 1929.

October Retail Sales Estimated at 164,500

PHILADELPHIA — New motor vehicle registrations in October amounted to 164,500 as against 189,257 in September and 78,351 during October, 1932, according to estimates based on returns from 38 States. This estimate shows an indicated decrease from September of about 13 per cent but a substantial gain over October, 1932, of about 110 per cent.

Passenger car registrations amounted to 137,000 as compared with 157,976 during September and 63,195 in October of last year, showing a seasonal decline from September of approximately 13 per cent, but a gain over October, 1932, of 117 per cent.

Based on returns from 22 States, October new truck registrations amounted to 27,500 as compared with 31,281 during September and 15,156 for the same month last year.

Hudson to Offer Independent Wheel Option in 1934

DETROIT—Independent springing of the "axleflex" type will be available as optional equipment on 1934 Hudsons and Terraplanes, it was learned here authoritatively today. This type of suspension was described on page 574 of the Nov. 11 issue under designation of "articulated axle." The design permits of flexibility of the axle assembly in a vertical plane while retaining standard springs and shock absorber equipment.

Ford Truck Makes Fast Coast to Coast Trip

PHILADELPHIA—Averaging 41.4 m.p.h. and 9.1 miles per gal., a Ford eight-cylinder truck with panel body and carrying a two-ton load, this week completed a transcontinental run from Atlantic City to Los Angeles. Three drivers were used, all being salesmen of a local Ford dealer.

Louis Albert Safford

Louis Albert Safford

ST. LOUIS—Louis Albert Safford, vice-president of the McQuay-Norris Manufacturing Co. of this city, died last week in Detroit at the home of his sister, Mrs. Stewart Hamilton, at the age of 54. Death came as the result of cerebral hemorrhage and arteriosclerosis.

Mr. Safford was one of the best-known and widely respected men in the automotive parts manufacturing and distributing fields, and for years was a leader in the industry's association activities. He was born in Grand Haven, Mich., and one of his early connections was with the Associated Press in Detroit, where he advanced to the position of Michigan manager.

Later he became associated with the Chilton Co. and had charge of the Chicago territory for that company. In 1915 he joined McQuay-Norris as vice-president, a position which he held until his death.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

General business last week showed considerable improvement. Retail trade was stimulated to the extent that it surpassed the level in the corresponding week in October and was substantially above last year's level. The movement of seasonal goods became more active as cold weather spread throughout many sections of the country. The recent decline in industrial activity was checked to some degree, and in many cases the trend was decidedly upward.

Food Prices Decline

Average retail food prices during the two weeks ended Oct. 24, continued to decline. The index on that date stood at 106.6, as against the high point for the current movement of 107.4 reached on Sept. 26. Retail food prices, however, still remain 18 per cent above the low point reached last April.

Freight Loadings Drop

Railway freight loadings during the week ended Nov. 11, totaled 577,676 cars, which marks a decrease of 30,109 cars below those during the preceding week, an increase of 40,989 cars above those a year ago, and a decrease of 112,284 cars below those two years ago.

Power Production Steady

Production of electricity by the electric light and power industry during the week ended Nov. 11 was 6.3 per cent above that in the corresponding period last year.

Construction Increasing

Construction contracts awarded in 37 eastern States during October, according to the F. W. Dodge Corporation, amounted to $145,367,200, as against $107,273,900 in the corresponding period last year.

Chain Stores and Mail Orders Improve

Sales of 20 store chains during October were 4.8 per cent above those a year ago. The mail order chains showed the greatest improvement with an increase of 18.7 per cent above sales in the corresponding period last year.

Cotton Consumption Firm

Cotton consumption during October amounted to 570,771 bales, including linters, as against 575,937 bales during September and 565,222 bales during October, 1932.

Wholesale Prices Swinging Up

Professor Fisher's index of wholesale commodity prices for the week ended Nov. 18, stood at 72.1, as against 71.6 the week before, 71.8 two weeks before, and 72.2, the high for the current movement, for the week ended October 14, 1933.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended Nov. 15, showed a decrease of $1,000,000 in holdings of discounted bills and an increase of $2,000,000 in holdings of government securities. Holdings of bills bought in the open market increased $8,000,000, which marks the first change in this figure since April 16, of this year. The reserve ratio on Nov. 15 was 65.1 per cent, as against 65.2 per cent for both a week and two weeks earlier.

Wild Trading Ruled Out After Nov. 30

ST. LOUIS—The used car sections of the motor vehicle retailing code go into effect beginning December 1, according to announcement by F. W. A. Vesper, chairman of the National Control Committee. The new used car guides, said to be based on about 300,000 retail used car sales, presumably will be in the hands of dealers at that time. The guides will be issued monthly in 20 sectional editions.

Noblitt-Sparks Busy

CHICAGO—Business of Noblitt-Sparks Industries, Inc., is proceeding at a rate, which if maintained, will make November the best month of the year, both from a sales and profit standpoint, Frank Sparks, treasurer, reports. The company is producing 2500 automobile heaters daily, he said, and is turning out 2000 automobile mufflers on a single contract, besides other automotive items.

Shipments of heaters up to Monday totaled 133,000 against 114,000 in all of last year. The company returned to profitable operation in the first six months of the year, showing net of $22,172 compared with a deficit of $223,904 in the corresponding period of 1932.

Gibney Named Willard Vice-Pres. and Sec'y.

CLEVELAND—C. H. Gibney, who has occupied the office of Comptroller and Assistant Treasurer of the Willard Storage Battery Co., for a number of years, has been elected vice-president and secretary. Harry G. English, who came to the Willard Credit Department in 1918, succeeds Mr. Gibney as Assistant Treasurer. Mr. English has made several advancements during his 15 years with Willard, being appointed Cashier in 1920 and Credit Manager in 1923. He will continue supervision of the Credit Department in his new capacity. Harley A. Gardner has been recalled from South Africa, where he has been doing special work for Willard, to become Assistant Credit Mgr. Mr. Gardner has been with Willard since 1927 when he was made Office Mgr. of the Cleveland Branch.

National Inspection Law Proposed by Tom Duggan

CLEVELAND—A national automotive inspection law calling for semi-annual check-ups of all motor vehicles is advocated by Tom O. Duggan in a booklet just published by Thompson Products, Inc. He also proposes the licensing of automobile mechanics. Mr. Duggan sees as the advantages of the proposed law a stimulation of business and employment in the automotive maintenance field, increased car sales, fewer deaths and less property damage from highway accidents, larger federal and state revenues, more pride of craftsmanship among automotive mechanics and assistance to the War Department in the event of a national emergency.

Austin Raises Prices

BUTLER, PA.—Prices on all Austin models have been increased $30 except on the business coupe which has been raised $10. Higher labor and material costs under NRA are given as the reasons for the increases by president R. O. Gill.

New DeSoto Sales and Advertising Officials

Left to right—Ross Williams, Plymouth supervisor; H. Curby Jamerson, director of advertising and sales promotion, and F. L. Wiethoff, assistant to general sales manager Peed

Rear Engines Within 10 Years, Klingler Predicts

PONTIAC — Streamlined, rear-engined cars capable of 100 m.p.h. within 10 years were predicted by H. J. Klingler, president and general manager of Pontiac Motor Co., at a luncheon given here in his honor by local business and professional men.

"You are conservative," Mr. Klingler said. "That prevents radical changes in automobile design. We have to progress slowly. We create beautiful colors for your automobiles. You admire them and buy black." Mr. Klingler predicted important changes in the 1934 Pontiac but said that he was not at liberty to reveal the details. He did say, however, that the new car would do 80 m.p.h.

Powell Strike Settled

WASHINGTON, D. C.—Settlement of the Powell Muffler Co. strike affected by the National Labor Board provides that the controversy be terminated at once and that employees to be placed back at work are to be drawn without discrimination exclusively from the payroll list of September 20, 1933. The agreement provides for the employment as long as there is work of six key men who are named, and for the employment of the remaining 56 men involved on a shift basis.

Norton to Hold Exhibit of New Equipment

WORCESTER, MASS. — During the week of Dec. 4, the Norton Company will hold an exhibit in their factory to introduce a large group of newly-developed equipment some of which is specifically designed for automotive production.

Among the tools to be shown are the following automotive applications: a new crankpin grinder; the Nortonizer, an automatic electric sizing device; and the Cam-O-Matic, an automatic camshaft grinder. All equipment will be set up under power for demonstration. The new line will be described in subsequent issues of *Automotive Industries.*

Stanitzke and Southard In New Fisher Body Posts

FLINT—Otto J. Stanitzke, for several years manager of the Fisher Body plant in Kansas City, has been appointed manager of the Fisher plant at the Chevrolet factory here. He succeeds John Southard who has been transferred to Fisher staff activities in Detroit.

B. N. MacGregor, new vice-president and general manager of the Packard Electric Corp.

NACC Reduces Day Admission to Show

Decorations to Provide Modernistic Background

NEW YORK—The day admission price to the New York and Chicago automobile shows has been reduced to 50 cents. The 75 cent rate will continue in the evening, according to Alfred Reeves, vice-president and general manager of the National Automobile Chamber of Commerce and manager of the shows. Mr. Reeves also revealed that a modernistic motif will form the background for the 1934 exhibitions.

The fact that a great many manufacturers have indicated their intentions of withholding the introduction of their new lines until the opening of the New York Show on January 6, and the recent announcement of Charles D. Hastings, Chairman of the Board, Hupp Motor Car Corporation and Chairman of the Show Committee, of plans to encourage the use of exhibits embodying action, may be expected to result in increased interest in the Shows.

Precision machinery, cut-out chassis and many unique methods of presenting the product will be included in the spaces of exhibitors of parts or accessories as well as cars. Sketches of these devices must be submitted to Mr. Reeves for approval to make certain that they will not interfere with adjoining exhibitors.

While all the car and truck space has been taken in New York there is still some space available for the exhibition of parts and accessories, which will be a much bigger attraction this year because of a decision by the management to extend invitations to the jobbers and accessory dealers for the Show just as motor vehicle dealers have been invited in the past.

Fred J. Skinner

TORONTO—A pioneer of the automotive industry of Canada passed away in the death of Fred J. Skinner, member of the Ontario Legislature and founder of the Skinner Mfg. Company Limited, manufacturer of automobile bumpers and other parts on a large scale, death taking place in the Kingston Hospital.

Some years ago the Skinner company was sold to the Houdaille Hershey Corporation, Mr. Skinner retaining the presidency of the Canadian branch of the organization. The plant was moved to Oshawa, Ontario, where the enterprise was closely associated with General Motors of Canada Limited in the production of parts and equipment for G.M. cars. Mr. Skinner, who was in his 67th year, is survived by his wife, formerly Bertha Van Heuson of Johnston, N. Y., and one son, Frederick, who is the general manager of the Skinner industry.

Farmers, Shippers and Labor Register Opposition at Hearing on Truck Code

WASHINGTON — The Trucking Code hearing, held last week, developed considerable opposition but not from any unexpected quarter.

On the other hand, the opposition served a good purpose in that it encouraged the local cartage operators in metropolitan areas and over-the-road haulers to conciliate their differences and thus make it possible for the American Trucking Associations, Inc., to present a united front in support of the code. This conciliation was effected when the code was amended to permit local trucking groups in metropolitan areas to file appendices to take care of their working hours, wage and trade practice problems.

While the submitted code specifically exempted the farmer who transports his own property, produce or supplies, this exemption was not sufficiently exclusive to satisfy representatives of various agricultural organizations. Some urged that the farmer who transports for hire be excluded from the jurisdiction of the code; others asked that all trucks hauling farm produce be exempt, several mentioning milk and dairy products, and still others opposed the code on the general theory that regulation of trucking as contemplated would increase farm prices and so be contrary to the intent of the Administration's agricultural legislation.

The National Industrial Traffic League, representing shippers, protested the inclusion of provisions fixing or regulating rates for transportation. Opposition was on the premise that the League always has opposed statutory and legislative regulation of rates and that the code, in effect, would bring this about. Warning was given that rate increases might force industrialists to operate private fleets.

The hours and wages in the code did not have the approval of labor unions. The International Brotherhood of Teamsters, Chauffeurs & Helpers favored a 40-hr. maximum week instead of 48, and an 8-hr. day. The Metal Trades Division of the American Federation of Labor, representing the interests of shop mechanics, urged a 40-hr. week and a sliding scale of wages with a flat minimum of 45 cents per hour, and that both northern and southern States be treated alike. The code has a scale of minimums ranging from 35 to 50 cents an hour in the North and 25 to 40 cents in the South.

Still another labor representative, who said he was organizing truck drivers, suggested a 30-hr week and a minimum of 75 cents per hour for drivers.

The National Furniture Warehousemen's Association and the National Retail Coal Merchants Association asked that their members be permitted to operate under separate codes.

In recessing the hearing Deputy Administrator Hughes declared that the trucking code was one of the most difficult before the NRA and required the earnest cooperation of all groups.

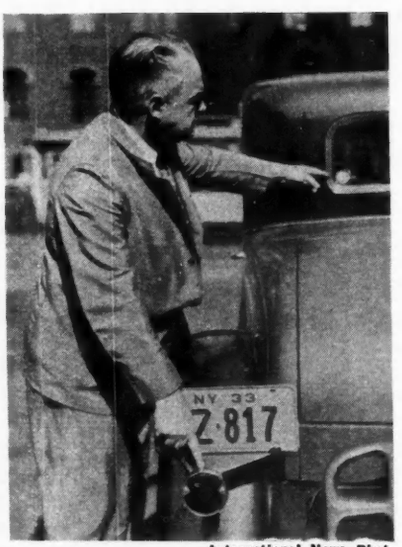
The A. T. A. named a Code Contact Committee to carry on negotiations with the NRA until a code is approved.

Stoeckel to Undertake Road Research Projects

NEW HAVEN, CONN.—Robbins B. Stoeckel, formerly Connecticut Commissioner of oMtor Vehicles and now Research Associate assigned to the Graduate School of Yale University, is prepared to discuss highway traffic subjects for research participation. It is hoped that, by correspondence and interview, this activity will develop into a center from which Yale may contribute to the solution of current problems in highway transportation.

Indian Sales Increase

SPRINGFIELD, MASS.—The Indian Motocycle Company and wholly owned subsidaries report a net loss of $9644, after depreciation, interest and other charges for the quarter ended September 30, 1933, compared with net loss of $50,049 for the third quarter of 1932. Net loss for the first nine months of 1933 was $58,974 including $76,424 depreciation charges as compared with $94,030 in the first nine months of 1932, which included $93,972 depreciation charges. Net sales for the third quarter were $186,660 as compared with $141,900 in the same period in 1932.



International News Phot

Orestes H. Caldwell, president of the New York Electrical Society, points to the electric eye which automatically turns on the parking lights when daylight wanes, and turns them off when it returns

Russia Seen as Good Future Motor Market

Industry Does Not Expect Any Immediate Sales Rush

DETROIT—That benefits to the automotive industry of official recognition of U. S. S. R. will not be immediate in character is the consensus of opinion in Detroit export circles. Eventually, however, it is believed that American manufacturers will be able to benefit materially from Soviet needs for motorized transportation in anticipation of development of good roads system in that large country.

E. C. Morse, president of Chrysler Export, expressed the sentiment of the majority in stating that U. S. S. R. will probably see an extensive development of motorized transportation beyond its own capacity to meet through internal production of motor cars and trucks and that the facilitation of trade relations through Soviet recognition will divert a major portion of necessary vehicle purchases, through Amtorg Trading Corp., to American manufacturers.

It is not believed that recognition or negotiations under way will open the doors to American producers for private sale of cars in U. S. S. R. Unless there develops a place for private passenger cars in the Soviet economic scheme it is not expected that automotive sales will be consummated except through governmental agencies such as Amtorg.

Chrysler Has Male Choir

DETROIT—A male choir of 150 voices drawn from the ranks of Chrysler employees will give a concert here on Dec. 13. The conductor is Thomas Lewis, assistant personnel director of the Chrysler Corp. Walter P. Chrysler and a delegation of Detroit and New York executives are expected to attend.

R. E. Olds Guarantees Xmas Savings Accounts

LANSING—R. E. Olds is personally guaranteeing the Christmas savings accounts of some 16,000 school children in the defunct Capital National Bank. The accounts total about $59,000.

"In order that an industry may solve its own labor problems of hours, wages and working conditions, it will be necessary to establish a Sub-Committee of the Code Authority on which Sub-Committee labor must have adequate representation. In other words, matters pertaining to employee relations can only be passed upon by management through a committee on which employees have proper representation of their own choosing." From a speech by NRA Division Administrator Malcolm Muir.

Independent Suspension On GM 1934 Cars

(*Continued from page 650*)

whereby Russia could buy substantial amounts of products and materials in this country.

Our capital goods industries, he pointed out, have lagged behind in recovery and Russia is in the market for capital goods. Material help in relieving unemployment here might result from the working out of some plan by which Russia could buy large quantities of capital goods here.

"One lesson, however, we should have learned by experience since the war," Mr. Sloan emphasized, "namely, that we can't sell without buying. In thinking about what we may sell to Russia, we must ask ourselves the question, 'What can we take in return?" When we try to sell without buying, we are likely to find that we are making a donation instead of an investment."

J. W. Brussel Resigns

DETROIT—J. W. Brussel has announced his resignation as works manager of Timken Detroit Axle Co.

Nash Resumes Productions as Both Sides Agree to Settle Issues by Arbitration

Men Go Back to Work with Piece Work Plan Which Led to Strike in Effect Temporarily—National Labor Board a Factor in Settlement Negotiations

CHICAGO, Nov. 21.—Approximately 3000 employees of the Nash Motors Company at Kenosha returned to work today as a result of settlement of a wage dispute. The workmen have been idle since Nov. 9 when C. W. Nash, chairman of the board, ordered all production units shut down until the wage controversy originating in the assembly line, was settled.

The factory was shut down as a result of some 200 workmen walking out and refusing to continue on a piece work basis, which employees had themselves suggested to the plant officials as a means of spreading employment.

Agreement was reached last night between company officials and the United Automobile Workers' Union, representing the workmen, through the efforts of Dr. John A. Lapp, regional chairman of the National Labor Advisory Board and James Mullenbeck, federal mediator.

The agreement, Dr. Lapp stated, provides every workman return to the job he held Nov. 9 when the plant closed.

The piece-work wage plan of from four to four and one-half cents an operation, to which the assembly line workers objected, will remain in effect temporarily. The agreement reached last night provides that the assembly line workmen name three committeemen to deal with the company for the purpose of settling their differences.

It was also agreed that the company would recognize the principle of collective bargaining and would consent to the arbitration of all disputes between employees and the company before a full-time arbitrator acceptable to both the company officials and the workmen. The company retains the right of fair discipline and discharge.

A mass meeting of employees heard final approval of the terms of settlement late yesterday. A union official announced that the plan previously accepted by the company was also acceptable to the workers. Cheers greeted the announcement. Pickets were immediately withdrawn from the posts they have maintained outside the factory property for more than ten days.

The employees had rejected company proposals at a mass meeting Nov. 16. After hearing the offer of Mr. Nash through Dr. Lapp, they refused to return to work. This meeting, called by Eugene Stauder, president of the United Automobile Workers' Union, was attended by almost 2000 employees. The workers, at that time, declared they would return only when a program of revised wages, recognition of the union and improved working conditions was agreed upon.

From Nov. 9 until this morning the only employees retained by the Nash company were those on the office staff. Although the wage dispute came just as the company was at peak production of the new 1934 models, officials were confident that accumulating orders would be filled with the least possible delay, following settlement of the controversy.

Fight Store-Door Tariffs

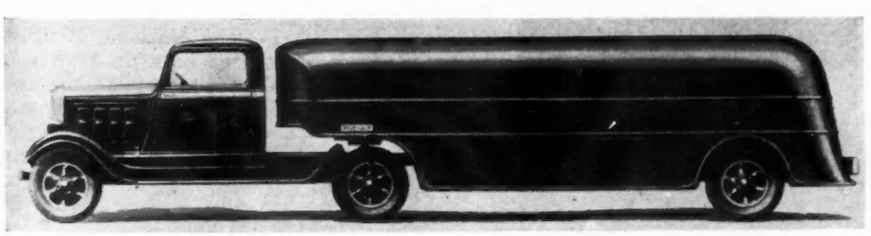
WASHINGTON—The question of whether the store-door delivery tariffs filed by the Pennsylvania, Erie and other eastern railroads shall become effective Dec. 1 was argued before the Interstate Commerce Commission on Nov. 1.

Proponents of the plan, which was opposed by American Trucking Associations, Inc., and by competing railroads, admitted that it was experimental and that, in the case of the Pennsylvania, it would occasion a loss of about $1,000,000 a year.

Ford to Show in N. Y.

NEW YORK—The Ford Motor Co. will stage an Exposition of Progress here beginning Dec. 9 in the new Port Authority Commerce Building. More than 150 manufacturers will cooperate in the enterprise which will be patterned after the highly successful show held recently in Detroit. Similar exhibits will be staged in Chicago and probably some other cities.

Streamlined Trailer



Gasoline and oil trailer, with long sweeping curves which has just been announced by the Fruehauf Trailer Co., Detroit. The tank, which may be any make, will be mounted on a Fruehauf semi-trailer of the drop frame type, adding to its streamlined appearance and providing for increased "roadability."

Left to right—V. L. Murray, O. L. Arnold, H. C. Gillespie, Sr. and H. J. C. Miller

Gilpin Names Pontiac Regional Managers

PONTIAC—Four regional managers have been appointed by A. W. L. Gilpin, general sales manager of the Pontiac Motor Company, to supervise the activities of the various zone offices. The appointees are H. J. C. Miller, regional manager at New York, with L. Horton as assistant; V. L. Murray in Detroit, with A. R. Shedd as assistant; O. L. Arnold, Chicago, with George Brower as assistant, and H. C. Gillespie, Sr., at Memphis, with W. T. Minor as assistant.

The following are zone manager appointments also announced by Mr. Gilpin:

A. G. Swan, Albany; F. C. Sibley, Boston; A. E. deLoach, New York; J. J. Costello, Philadelphia; A. C. Tiedmann, Jr., Washington; C. G. Riley, Buffalo; C. L. Alexander, Cincinnati; A. A. Klein, Cleveland; V. A. Davison, Detroit; O. F. Wampler, Indianapolis; C. C. Edmonds, Pittsburgh; O. L. Waller, Chicago; R. W. Losey, Denver; C. W. Mellon, Kansas City; H. D. Braun, Lincoln; L. H. Kurtz, Milwaukee; H. G. Krell, Minneapolis; W. J. Mougey, St. Louis; P. B. Divver, Atlanta; L. A. Folger, Charlotte; Allen Wright, Dallas; R. W. Peek, Memphis; L. B. Strayhorn, Oklahoma City, and A. M. Sanders, Portland, Oregon.

Dean Named Chevrolet Manufacturing Manager

DETROIT—Appointment of Hugh Dean as general manufacturing manager of the Chevrolet Motor Company, with headquarters in the central office, has been announced by C. E. Wetherald, vice-president in charge of manufacturing. Mr. Dean succeeds to the post vacated when Floyd O. Tanner was named to the staff of W. S. Knudsen following the latter's appointment as executive vice-president of General Motors.

Mr. Dean formerly had charge of Detroit and Toledo manufacturing operations of Chevrolet under Mr. Tanner. In his new post he directs all Chevrolet manufacturing activities, while W. C. Williams, Jr., retains supervision over all assembly plant operations, Mr. Wetherald said.

Gas Consumption Near 1932 Mark

NEW YORK—Gasoline consumption during August amounted to 1,530,086,000 gallons as compared with 1,497,715,000 gallons a year ago and 1,434,585,000 during July of this year, according to figures released by the American Petroleum Institute.

August consumption represents a gain of 2.16 per cent over August, 1932, and 6.6 per cent over July of this year.

For the first eight months the gasoline consumption amounted to 10,180,-184,000 as compared with 10,386,877,-000 for the same period of 1932 a loss of approximately 2 per cent.

McCord Radiator Earnings

DETROIT — Third quarter earnings of McCord Radiator Manufacturing Co. were $5,167. In the first nine months the company earned $11,-345 as contrasted with a deficit in the same period last year of $368,717.

Hugh Dean

$700 Plane Inquiry Draws Big Response

Information Will Be Given to Air Industry for Use in Formulating Selling Plans

WASHINGTON, D. C.—Response to the plan of the Aeronautics Branch of the Department of Commerce to stimulate production of low-priced airplanes has been immediate and enthusiastic, Eugene L. Vidal, Director of Aeronautics, announced this week. Many letters seek information as to where and how to buy the airplane, he said.

A beginning toward the collection of this information was made last week when Mr. Vidal addressed a memorandum to licensed pilots, licensed mechanics, and student pilots informing them that the aircraft industry could produce a two-place, low-wing monoplane to sell at $700 provided there was some guarantee of a market for at least 10,000 of the craft. He asked the pilots, mechanics and students to indicate whether they would purchase such an airplane at the price mentioned.

"In the first group of replies, which arrived by return mail, eight out of ten were from persons who said definitely that they would become purchasers," Mr. Vidal said. "However, we are bearing in mind that these persons are not actually purchasers until they have accepted delivery and made payments, and that the performance of the airplane finally offered and the prospects' future financial conditions will influence their final decisions.

"Whatever the results of the survey may be, we will turn the whole collection of information over to the civil aeronautics industry for use by any manufacturers who wish to take advantage of it. The Aeronautics Branch will not produce any airplanes, nor will it make any suggestion as to which manufacturers should undertake production. Our survey was undertaken on behalf of the entire aircraft manufacturing industry."

Bank of Detroit Earns $697,508

DETROIT—The National Bank of Detroit, organized here on March 24 last with half of its capital supplied by the RFC and half by General Motors, Chrysler and other local industries, reports that it has been in the black since May 2. At the end of March it had 4386 accounts and deposits of $29,629,000 while on October 25, it had 89,174 accounts and deposits of $163,503,397. Earnings to October 25 were $697,508. Cash on hand and due from banks amounted on that date to $56,705,000 and U. S. securities were $48,170,000. Loans and discounts totaled $78,024,510.

October Machine Tool Orders Gain

New Business at Highest Level Since December, '31

CLEVELAND—A substantial increase in the index of orders for October is reported by the National Machine Tool Association. Volume of new business has now crossed the best month of 1932 and is back to the level of December, 1931. October usually brings seasonal strength to machine tool orders, but allowing for that, the month's business shows up well.

The indexes, weighted averages of 74 reports, are as follows:

	August	September	October
New orders.....	57.4	55.8	67.1
Shipments	39.4	42.9	51.7
Unfilled orders...	74.1	85.9	105.4
Three months' average of new orders	50.4	55.7	60.1

It must be remembered, of course, that normal operations, according to the experience of 11 years prior to 1932, is estimated at 159 on the index scale, or two and a half times the October rate of orders. Full one-shift capacity is estimated at 261. October orders, therefore, represent an activity of about 26 per cent of capacity.

Michigan Employment Above Last October

DETROIT—Employment in the automobile industry in Michigan during October totalled 164,044 compared with 119,920 in October, 1932, and 191,895 in September this year. These figures are based on reports of 96 companies and compiled by the State department of Labor and Industry at Lansing.

Aggregate weekly payrolls totalled $3,605,787 in October, $2,119,234 in October last year and $4,215,964 in September.

Average weekly earnings per capita were $21.86 in October, $21.97 in September and $17.67 in October, 1932.

H. J. Klingler Becomes President of Pontiac

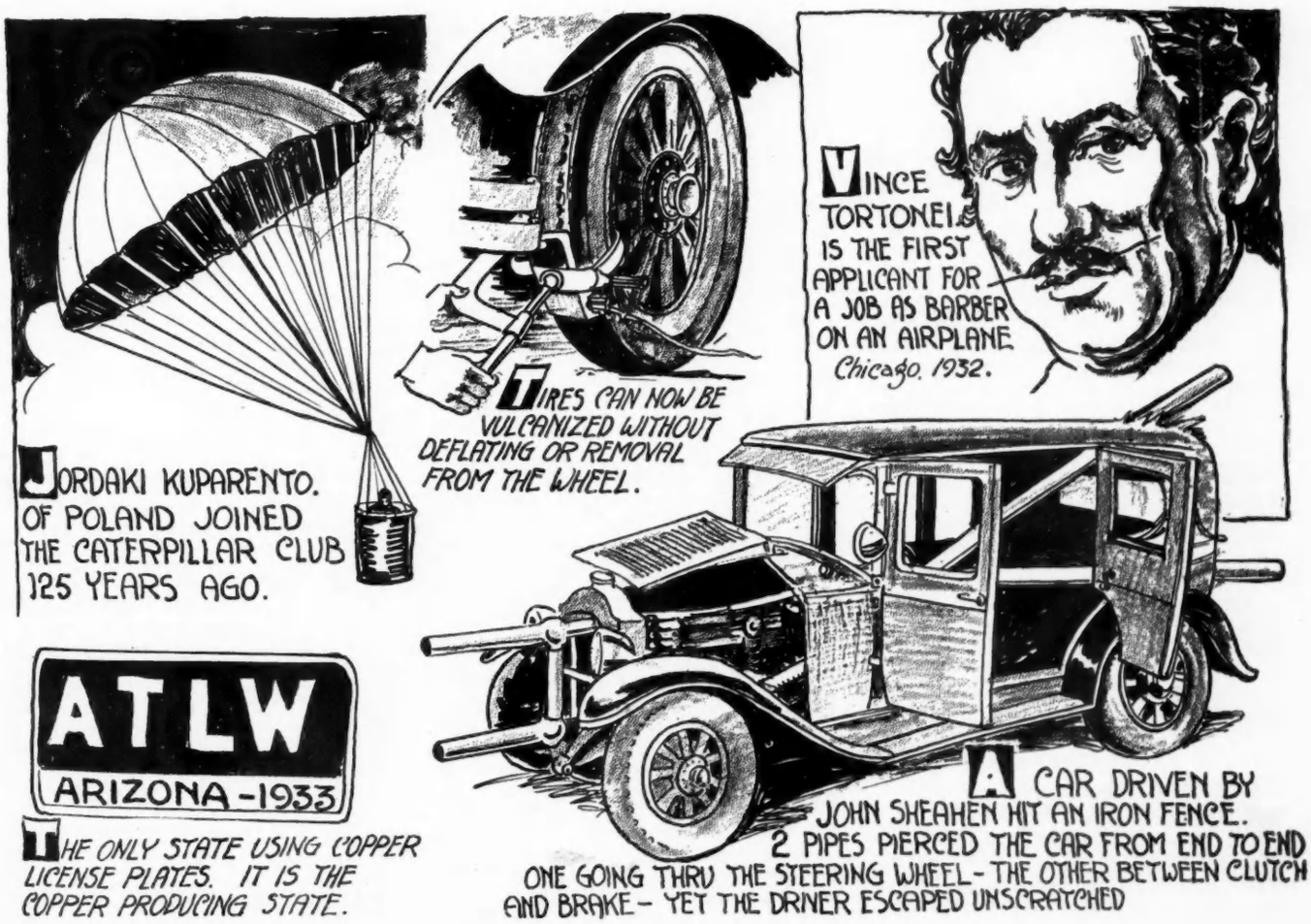
DETROIT—H. J. Klingler is now president as well as general manager of Pontiac Motors Co., while A. W. L. Gilpin has been named vice-president in addition to his duties as general sales manager. The appointments were made public late last week by W. S. Knudsen, executive vice-president of General Motors. Before his appointment as Pontiac general manager, Mr. Klingler was Chevrolet vice-president and sales manager, while Mr. Gilpin was a Chevrolet regional manager prior to becoming Pontiac sales manager.

Young Radiator Payroll at New High Record

RACINE, WIS.—Young Radiator Company reports that during the month of October, payrolls were the largest in the history of the company.

Automotive Oddities—By Pete Keenan

Write us if you know an Oddity


JORDAKI KUPARENTO. OF POLAND JOINED THE CATERPILLAR CLUB 125 YEARS AGO.
TIRES CAN NOW BE VULCANIZED WITHOUT DEFLATING OR REMOVAL FROM THE WHEEL.
VINCE TORTONE IS THE FIRST APPLICANT FOR A JOB AS BARBER ON AN AIRPLANE Chicago. 1932.
ATLW
ARIZONA-1933
THE ONLY STATE USING COPPER LICENSE PLATES. IT IS THE COPPER PRODUCING STATE.
A CAR DRIVEN BY JOHN SHEAHEN HIT AN IRON FENCE. 2 PIPES PIERCED THE CAR FROM END TO END ONE GOING THRU THE STEERING WHEEL - THE OTHER BETWEEN CLUTCH AND BRAKE - YET THE DRIVER ESCAPED UNSCRATCHED

Hartz Goes Forward With Car Backwards

Turns Conventional Car Around to Experiment With Streamline Design

NEW YORK—What happens if you take a conventional sedan and arrange the controls so it can be driven hind end foremost? Harry Hartz, racing driver, wanted a practical answer to this, so he took a Plymouth sedan, reversed the position of the driving gears in the rear axle, turned the steering wheel around, reversed the fan blade on the engine, and put remote controls on brakes and gear shifts.

With a few more lights in the rear section of the sedan body, headlamps on the rear fender and a tail light on the front fender he was ready to go. The car was driven from Michigan to New York City backwards at road speeds, and was demonstrated in New York, Nov. 21. A ride in the car about the New York streets demonstrated that it had exceptional acceleration and good roadability. No other claims were made.

Hartz planned to show the car to Prof. Alexander Klemin, Guggenheim School of Aeronautics, New York University. A model will be made and wind-tunnel tested. After establishing the point that the rear-end of a conventional car offers a better airfoil than the front end, Hartz plans to continue experimenting with streamlined bodies.

Tool Code Effective

WASHINGTON—The code for the special tool and die industry became effective Nov. 22. It was approved last Friday by President Roosevelt shortly before leaving for Warm Springs, Ga.

The NRA says it is estimated that approximately 25 per cent additional employees will be put to work by prospective new business and through the operation of the schedule of hours provided in the code. Payrolls for the same reason, it is stated, are expected to be increased about 33 per cent.

NACC Directors and Code Committee Meet

NEW YORK—The N.A.C.C. board of directors met here on Thursday of this week. It is understood that the major topic considered was the report of the code committee which met on the previous day.

Buy European Rights on Banker Transmission

DETROIT—Denes and Friedmann, Ltd., of Vienna, Austria, with branch offices in Berlin, Prague, Budapest, etc., announced here yesterday that they had purchased exclusive rights on the Banker Mono-Drive transmission for the European Continent, Great Britain and Colonies. The performance of this transmission in the Stout Railplane was an important factor to the closing of the deal.

Mr. Friedmann, president of Denes and Friedmann, expressed himself as expecting that in a very short time this device will be introduced in automotive vehicles in Europe.

Change Auto Show Hours

NEW YORK—The national automobile shows here and in Chicago will be open from 10:30 a. m. to 11 p. m. instead of from 10 a. m. to 10:30 p. m. as heretofore.

New Book on Aluminum For Motor Truck Bodies

PITTSBURGH—A new edition of its booklet on Alcoa Aluminum for Truck Bodies has been issued by the Aluminum Company of America. It contains more detailed engineering information than the earlier edition. Suggested designs for various types of truck bodies, supplemented by construction drawings, are included. In the early part of the book are given case histories, based on operator's records, which point to definite economic advantages of the use of light alloys for this purpose.

U. S. Chamber Moves to Secure Full Regulatory Powers over Business for Trade Associations

Legal Penalties and Prevention of Abuses Held Only Field for Governmental Intervention — Names Committee to Study NRA and to Recommend Changes

by L. W. Moffett
Washington Representative, Automotive Industries

WASHINGTON—"We can't do anything about it. Any one who wants to, can investigate the NRA. And it will be investigated all right."

This was the comment of General Hugh S. Johnson on the plan of the United States Chamber of Commerce to study the National Recovery Administration and to recommend modifications. Moreover, the Administrator made his observation in a tone indicating that he was rather indifferent to the matter. His remarks were made at a press conference last Tuesday when he was asked to give his opinion about the appointment by the Chamber of a committee to confer with a committee named recently by the Advisory Council of the Department of Commerce on questions of administering the National Recovery Act. Selection of the Chamber committee followed prior action of the Board of the Chamber in adopting resolutions attacking the Administration's monetary policy, and the use of public funds in competition with business, and dealing with the subject of self-regulation by industry under the Recovery Act.

It was evident that General Johnson looks at the whole matter as another of the many "dead cats" which are being thrown at the NRA.

The fact that the Chamber has aimed darts in the direction of the NRA has been given more weight than would be given if they came from other sources. For the Chamber, after all, was one of the sponsors of the idea of self-regulation in business. It was especially urged by President H. I. Harriman of the Chamber. But the policy of the NRA, in the estimation of the Chamber, as well as of some other business groups, is held to have far exceeded the intention of those who advocated self-regulation of business, with the Federal Government acting as a "partner." It is felt in these quarters that the NRA has adopted drastic rules, especially with regard to imposing employment conditions, such as wages, hours and its "collective bargaining" feature, that has put American business in a straitjacket. It is only fair to say, however, that all business does not share this view as the NRA also gets a great deal of commendation from some business units.

The conference to be held between the Chamber committee and the Commerce Department's Advisory Council committee will, according to a Chamber announcement, give particular attention to the administration of codes.

"There will undoubtedly be efforts to make clear the distinction between the code responsibilities of the industries themselves and those of the Government," the statement said.

The Chamber committee consists of some members who, the NRA considers, are especially hostile to codes. This NRA view adds to the interest the conference holds. By some it is contended that the plan is to move from the NRA codes as quickly as possible and to turn to self-regulation of business without Government partnership, something many think is far in the future, if it is ever realized. The long-range planning of an economic system, with which the Advisory Council of the Department is dealing, has strong appeal to many business men, and is partially reflected in the Swope plan.

In dealing with self-regulation by industry under the Recovery Act, the Chamber declared that in the orderly administration of a code it is only the legal penalties and processes provided in the law and abuses obviously harmful to the public or inherently wrong that should have the attention of the Government authorities. It stated that explicit recognition is given to representative trade associations by the Recovery Act. When such codes have received the President's approval, it was pointed out, the trade association must arrange for effective and uniform application of code

provisions. This comment was held to be significant in view of concern shown by many industries that the trend of the NRA policy is toward their regulation through code authorities, with Government representation, rather than through established and "truly representative" trade associations. The Chamber is insisting upon continued trade association representations.

"That this is the purpose of the law has been emphasized by the President, who has said that 'the organized national trade association becomes the directing authority for the industries it represents,'" said the Chamber, "and that in large measure ultimate success rests upon those who guide and direct these organizations. It necessarily follows that the development of trade associations should be promoted in order that they may the better perform the duties contemplated by the Recovery Act, and set up in each instance an effective agency of the industry to administer its code. This should at all times be the official attitude of everyone acting for the Government.

"In the application and administration of a code the agency of the industry itself should accordingly have every opportunity to consider promptly each difficulty which appears, whether through a complaint inside or outside the industry, or otherwise. The industry's agency should, without official intervention of any kind, be able to deal at once with every situation which arises affecting the industry, whether there be maladjustment or a failure on the part of some member of the industry to comply with code provisions. All representations as to the industry in relation to the code should be made directly to the agency of the industry. Charged with disposing of all matters that can be adjusted within the industry, the agency acts with complete knowledge of the observer appointed by the Government itself."

This idea of industry being regulated by trade associations was elaborated upon by Mr. Harriman in an address at Atlanta, Ga., when he reviewed the economic program of the Roosevelt administration. He was speaking before the southeastern division of the National Chamber and urged revision of both the Recovery Act and the Agricultural Adjustment Act. He said it was inconceivable that either of these two measures should ever be entirely abandoned. But as to the Recovery Act, which was given credit for some good accomplishments, he urged a change in the Government's policy of "compulsion and the adoption of the more orderly process of voluntary presentation of codes."

In enumerating reasons for opposition to the NRA, Mr. Harriman included one which he said developed because of the enormous task of passing upon hundreds of codes awaiting action has necessarily caused delay and uncertainty. This condition, he stated, is being rectified with the result that the organization of the NRA is today far more effective than it was three months ago.

Another prominent reason for criticism was said to have grown from the large number of unwarranted and unauthorized strikes and many misleading statements put out by labor organizations in their endeavor to quickly unionize the entire country.

"There is certainly no justification for statements by labor that only through affiliated trade unions can the worker obtain the benefits of the Recovery Act," said Mr. Harriman. "Labor has gained much from the act and its leaders owe it to themselves and to the public to exercise great restraint in the calling of strikes and the creation of industrial discord. The President's recent declaration that the merit clause of the automobile code was a fair interpretation of the law for all codes is a most important statement.

"The fundamental concept of the labor clause is the complete liberty of the employees to bargain collectively through representatives of their own choosing, these representatives to be selected without coercion. This means without the coercion of either the employer or the organizer of labor.

"The labor clause is simple. It permits the organization of labor and provides for free and fair collective bargaining. These are rights which the Supreme Court has rightly upheld, but there is nothing in the law which prevents the selection, retention or discharge of employees on the basis of merit, provided such action is not used as a cloak for coercion. There is nothing which prevents employers from freely discussing the desirability of joining or refraining from joining a labor union, and there is nothing which compels an agreement between employer and employee if fair terms cannot be reached through collective bargaining."

Haig Named Head of Chevrolet Fleet Sales

DETROIT—Appointment of N. K. Haig to the newly created post of managing director of government sales for the Chevrolet Motor Company has been announced by W. E. Holler, general sales manager.

The new office involves supervision of all passenger and commercial car fleet sales to private individuals and firms, as well as fleet deals with federal, state, city and other governmental agencies, Mr. Holler stated.

For the past two years Mr. Haig managed fleet sales in the commercial car department of the company. He has been eleven years with Chevrolet, having joined the accounting department in 1923.

Foy Appoints de Seversky

DETROIT—Major Alexander P. de Seversky, noted aeronautical engineer and designer, has been employed as consulting engineer for the DeSoto Motor Corp., according to announcement today by Byron C. Foy, president.

Ralston Appoints Bell

DETROIT—D. E. Ralston, Oldsmobile sales manager, announces the appointment of G. H. Bell as sales promotion manager for Oldsmobile. Mr. Bell has recently been associated with the Buick factory sales organization.

Steel Makers Look for Heavier Buying

Declining Automotive Stocks Expected to Stimulate Demand as National Shows Approach

NEW YORK—While tonnage commitments for steel products by automotive consumers are still in the prospect stage, small lot orders for new model requirements are being placed in larger numbers. From this it is inferred that what reserve stocks of steel automotive consumers had on hand have been whittled down considerably and that even moderate production schedules for initial output of 1934 models will necessitate broader buying immediately following the shows.

Reading between the lines of the report made covering the first 90-day period during which the Iron and Steel Industry's Code of Fair Competition has been in operation, steel buyers sense that during the six months' extension until May 31, 1934, which has been asked, the principal aim will be to perfect the machinery by which the stabilization of the market now in evidence has been attained and that, barring unforeseen developments in the general economic situation, prices will hardly be subject to wholesale upward revision.

There is still a good deal of criticism voiced by producers of certain classes of finished steel products, such as automobile sheets, that their profit margins, even allowing for a much better rate of operations, are not what they should be. On the other hand, steel producers are well aware that the pressure brought by the Administration to lower the price of steel rails has engendered much potential resistance to further price advances from consumers of other steel products, and the general disposition is to let well enough alone.

Interest in automotive alloy steels is on the uptrend, tentative inquiries coming to specialists in the alloy field indicating that the proportion of alloy steel demand to that for plain steels will show a further increase next year.

Pig Iron—A Massachusetts producer filed an advance of $1 per ton in his base price, effective Dec. 1. Shipments against contracts have undergone slight broadening, but melters seem in no special haste to close for their further needs.

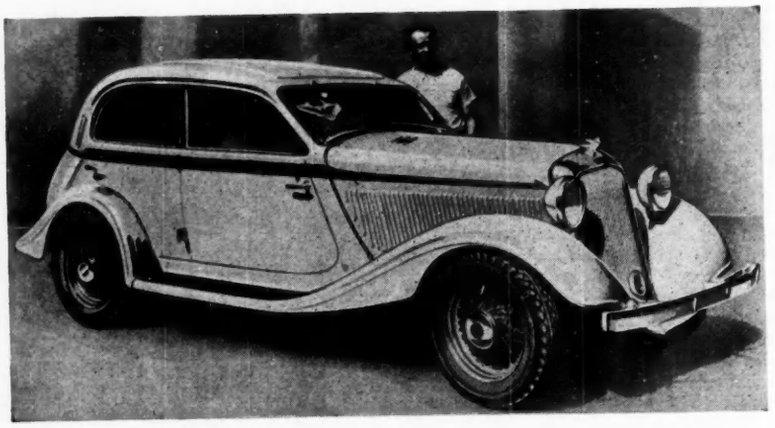
Aluminum—Unchanged and quiet.

Copper—The market shows little change, definite word on agreement on the proposed code being still awaited. The undertone, if changed at all, indicates, however, considerable strength.

Tin—Spot Straits tin was quoted at 55c. at the week's opening and made further fractional gains on Tuesday. A year ago this metal sold at 23½c.

Lead—Steady and quiet.

Zinc—Four out of every five mines in the Joplin district have shut down until December 4. Shortage of zinc concentrates caused Anaconda to close several of its electrolytic zinc refining units. The general tendency is to curtail ore production, so as to stiffen prices which continue at 4½c., East St. Louis for Prime Western.



Streamlined special body built in Italy and mounted on a Plymouth Six chassis.

Tire Shipments and Output Decline; Inventories Rise

NEW YORK—Shipments of pneumatic casings in the month of September decreased 25 per cent below August but was 13 per cent above September, 1932, according to statistics released by the Rubber Manufacturers Association, Inc. Production of pneumatic casings decreased 19 per cent under August but was 57.5 per cent above September, 1932.

Pneumatic casings in the hands of manufacturers September 30 increased 7.4 per cent as compared with August 31 stocks and 24. per cent above stocks September 30, 1932.

The actual figures are as follows:

PNEUMATIC CASINGS

	Shipments	Production	Inventory
Sept., 1933	3,503,365	3,999,239	7,594,506
Aug., 1933	4,707,085	4,993,609	7,069,574
Sept., 1932	3,082,285	2,538,720	6,096,098

"Met" Sections Holds Ocean Flying Meeting

Chamberlin and Armstrong Take Lead in Discussion

NEW YORK—At a meeting attended by more than 400 members and guests on November 16, the Metropolitan Section of the Society of Automotive Engineers heard several prominent authorities discuss the various types of trans-Atlantic air service, which it is expected will be inaugurated in the near future. Coming on the heels of the announcement that the Government will finance the construction of floating seadromes in the Atlantic, special interest was added to the discussion by the forceful remarks of Edward R. Armstrong, designer of the seadromes to be built, who made a special trip here from Washington to give his view on the subject.

Clarence Chamberlin, who acted as chairman of the meeting, in giving his own views, stated that he is not averse to the proposed seadromes, but questions whether they can be made large enough to permit of safe landings in the fog when blind flying with control of the plane by radio is required. This type of flying he considers essential for the maintenance of fixed schedules regardless of weather, which he believes will be required. In his rejoinder, Mr. Armstrong took the view that even this condition might be met by the seadrome but was not so important as other factors which help to make the seadrome system the most practical from several standpoints. The seadromes, he pointed out, would constitute a self-liquidating project, and would be covered by insurance in the event of their loss.

Other types of service and the possible conditions to be met in them were discussed by several other speakers, as were the types of planes required

Milwaukee S.A.E. Section Holds Diesel Engine Meeting

BELOIT, WIS.—Three hundred engineers attended a joint meeting of the Milwaukee section of the Society of Automotive Engineers and the Rock River Valley section of the American Society of Mechanical Engineers at the main works of Fairbanks, Morse & Co., for a study of Diesel engine practice. The afternoon was devoted to a tour of inspection of the plant. Dinner was served in the plant cafeteria and a business session followed, with H. L. Horning, president of the Waukesha Motor Co., presiding. R. L. Howes, of Fairbanks-Morse, read a paper on "Development and Application of Heavy Duty Diesel Engines." T. B. Rendel, of the Shell Petroleum Corp., discussed "Automotive Compression Ignition (Diesel) Engines and Their Fuels."

CALENDAR OF COMING EVENTS

SHOWS

English Motorcycle & Cycle Show, Olympia .....Nov. 25-Dec. 2
New York, Automobile Show....Jan. 6-13
Toronto, Ont., Automobile Show, Jan. 13-20
Milwaukee, Wis., Automobile Show, Jan. 13-20
Newark, N. J., Automobile Show, Jan. 13-20
Cleveland, Ohio, Automobile Show, Jan. 13-20
Cincinnati, Ohio, Automobile Show, Jan. 14-20
Philadelphia, Pa., Automobile Show, Jan. 15-20
Brooklyn, N. Y., Automobile Show, Jan. 15-20
Detroit, Mich., Automobile Show, Jan. 20-27
Hartford, Conn., Automobile Show, Jan. 20-27
Baltimore, Md., Automobile Show, Jan. 20-27
Boston, Mass., Automobile Show, Jan. 20-27
San Francisco, Calif., Automobile Show .....Jan. 20-27
Montreal, Automobile Show....Jan. 20-27
Chicago Automobile Show, Jan. 27-Feb. 3
Washington, D. C., Automobile Show .....Jan. 27-Feb. 3
Camden, N. J., Automobile Show, Feb. 3-10
Los Angeles, Automobile Show..Feb. 3-11
Omaha, Neb., Automobile Show..Feb. 5-9
Rapid City, S. D., Automobile Show Feb. 7-10
Springfield, Ill., Automobile Show, Feb. 8-10
Kansas City, Mo., Automobile Show, Feb. 10-17
Syracuse, N. Y., Automobile Show, Feb. 10-17
Black Hills, S. D., Automobile Show Feb. 15-17
Des Moines, Ia., Automobile Show, Feb. 19-24
Evansville, Ind., Automobile Show, Feb. 20-24
Denver, Colo., Automobile Show, Feb. 20-28

CONVENTION AND SHOW

Natl. Assocn of Engine and Boat Mfrs., New York City ....Jan. 19-27

CONVENTIONS

International Power & Engineering Conference, New York City...Dec. 3-8

MEETINGS

Perdue University, Welding Meeting, Lafayette, Ind. .....Dec. 7-8
Natl. Automobile Dealers Assoc. Meeting, New York City .....Jan. 8
Rubber Assoc. Meeting and Banquet, New York.....Jan. 8
S.A.E. Annual Dinner, New York...Jan. 8
Motorcycle & Allied Trades Assoc. Annual Meeting, New York...Jan. 10
S.A.E. Annual Meeting, Detroit.Jan. 22-26

CONFERENCE

Lafayette, Indiana, Welding Conference (Auspices of Purdue University) .....Dec. 7-8